

Baseline Impact Findings

For an Outcomes Evaluation of School-to-Work Transition Initiatives in Washington State

Phase I Impact Report

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I. INTRODUCTION

School-to-Work (STW) initiatives in Washington State were developed in the context of a generalized education reform that began in 1991. Central to the state's vision for STW is that all students should be exposed to a broad range of work- and school-based activities designed to enhance their future career opportunities. Important components of the state's vision of a comprehensive STW system are the integration of academic and vocational education and the development of strong partnerships among business, labor, and educators.

Through a competitive process, Social Policy Research Associates (SPR) was awarded a contract in 1997 by the Washington State Workforce Training and Education Coordinating Board (WTECB) to conduct a net impact evaluation of STW in the state.

To date, SPR has prepared several documents related to this evaluation, including a Design Report and reports on surveys that SPR conducted from mid- to late- 1997 with Washington State schools, students, and employers (D'Amico, Perry, and Midling, 1997; D'Amico and Wiegand, 1998; Wiegand and D'Amico, 1998a and 1998b). Because readers of this report will not necessarily have read these works, we have summarized some of their most salient elements here. In addition, we draw on a process evaluation of STW in the state that is being conducted by the Northwest Regional Educational Laboratory (Owens, 1995 and 1997).

This report is divided into five chapters. The remainder of this first chapter details several models of STW programs, discusses the current state of Washington State's STW implementation, and explains the conceptual framework that has guided our evaluation effort. In Chapter II we discuss our research methods, including the selection of the school sample, sources of relevant data, variable measurement, and our approach to the analysis. Chapter III develops a categorization of schools with respect to their STW implementation strength and strategies. Chapter IV discusses factors that facilitate and impede implementation. Chapter V presents our baseline analysis of outcomes associated with STW for a sample of high school seniors from the class of 1996.

WHAT IS SCHOOL-TO-WORK?

National and state school-to-work initiatives, as they are currently conceived, are designed to help *all* young people make the transition from school to careers and lifelong learning. STW initiatives are not intended to establish new programs, but rather to build

on the experience of existing models and efforts such as those discussed later in this chapter.

Providing concise definitions of what STW *is* or even what it *should be*, however, poses difficulties for policy-makers, practitioners, and researchers. These difficulties are due in part to the amorphous nature of STW and the fact that STW is comprised of extremely varied components among different schools and districts. Difficulties in precisely defining STW are also due to the rapid development and metamorphosis of conceptual models of STW over the past decade.

Earlier STW Formulations

As Glover and King (1997) point out, earlier STW models from the late 1980s into the early 1990s were primarily concerned with improving the employment preparation and prospects of the noncollege bound or “forgotten half” of American young people. Studies from this period focused on the effects of post-industrial restructuring that began in the 1970s. As the relative demand for workers in industrial occupations began to fall, a series of reports began to reflect the concern among business leaders that traditional vocational education programs were not providing students with the intellectual skills required to function within a rapidly changing workplace environment.¹ Prior to the economic restructuring of the 1970s, stable jobs could be found in industries based on mass production. By the 1980s, however, many jobs—particularly those in “high-performance” organizations—required not only workplace skills, but also well-developed intellectual skills, the ability to work cooperatively in groups, effective communication skills, and well internalized notions of quality control.² Moreover, the skills required for entry-level workers were increasing at a time when the absolute number of young people as a proportion of the population continued to decline.³

Certainly, many of these problems persist into the present time. Employers consistently complain of the absence of adequate early career preparation for youth and

¹ See for example the National Commission on Excellence in Education, 1983; National Academy of Sciences, 1984; Committee for Economic Development, 1985; William T. Grant Foundation Commission on Work, Family, and Citizenship, 1988; Commission on the Skills of the American Workforce, 1990.

² These and other skills were suggested by the Secretary’s Commission on Achieving Necessary Skills, or SCANS (Department of Labor, 1991).

³ For example, over the next forty years, the median age of the U.S. population is expected to increase from a median of 34 years to over 39 years (figures based on U.S. Bureau of the Census, 1995, 1994 middle series projections).

the problem of finding qualified entry-level employees.⁴ The problem of unemployment among youth—particularly for those with little or no college education—also continues to be reason for concern from both an economic and from a psychological perspective. The transition from schools to careers for many of these youth has been described by some authors as a “floundering” period (Osterman, 1980 and 1989; Hamilton, 1990). Early adulthood for many is often characterized by seemingly directionless job hopping from one low-paying job to another, a weak attachment to the labor force, and frequent spells of joblessness. Prolonged unemployment for youth also represented a lost opportunity for investment in job skills. Several authors have suggested that youth who do not find steady employment during their early careers period risk being scarred, often experiencing subsequent reduced wages and high rates of unemployment (Ellwood, 1982; Lynch, 1989; D’Amico and Maxwell, 1990). On the other hand, students who *do* gain work experience during their high school years, earn higher wages in the years subsequent to graduation (Meyer and Wise, 1982; D’Amico, 1984; Lynch, 1989; D’Amico and Maxwell, 1990).

The Movement towards Universality

Although addressing the needs of non-college bound youth continues to be an important consideration for designers of STW transitions, the focus has shifted away from traditional vocational education strategies to an emphasis on establishing integrated STW *systems*. STW is now promoted as part of larger school reform efforts designed to help *all students*, regardless of whether these students are deemed “college-bound” or not (Goldberger and Kazis, 1995; Glover and King, 1997). The change in emphasis is due not only to the change in the mix of skills required for jobs, but also to the desire to de-stigmatize career education, to discourage tracking, and to encourage contextual learning.

As STW reforms were being developed, one major concern was that if students who perform well academically and aspired to a college education reject STW programs, STW initiatives risked being viewed as second-rate “dumping grounds” for non-academically inclined students. There were also serious philosophical questions concerning the existence of separate tracks for vocational and academic education. Since the early years of this century, progressive educators, most notably John Dewey, had strongly argued against the creation of a bifurcated educational system of “vocational” and “academic”

⁴ See for example, Judy and D’Amico, 1997. According to figures cited from “Dispelling myths about school-to-work,” more than 50 percent of U.S. employers say they cannot find qualified applicants for entry-level positions and American business spends nearly \$30 billion training and retraining its workforce (www.stw.ed.gov/factsht/fact7.htm).

tracks. Dewey noted that not only did such a system unduly limit intellectual development for those in the former track, it also provided little “real-world” experience for those in the latter track (Dewey, 1916; also see Lazerson and Grubb, 1974; Stern et al., 1995).

For both philosophical and practical reasons, therefore, by the early 1990s, a growing consensus had developed that STW initiatives should seek to target *all* youth, rather than only students deemed unlikely to attend or complete college. The 1990 amendments to the Carl Perkins Act, for example, stressed the integration of academic and vocational curricula while also providing federal support for the articulation of high school and college curricula within Tech-Prep programs (U.S. Department of Education, 1990).

The 1994 School-to-Work Opportunities Act (STWOA) reinforced these goals by requiring the integration of school-based and work-based learning, academic and vocational curriculum, and the creation of formalized links between secondary and postsecondary educational institutions. Current STW initiatives not only reflect a strong orientation toward meeting workplace requirements, but also toward providing greater access to labor market information, career guidance, and counseling for students of all grade levels and perceived abilities. To achieve these goals, the federal and state STW initiatives encourage a variety of strategies including school-based and work-based work opportunities.

A Systemic and Relevant Approach

STW seeks to create a *system* that benefits all students by integrating education about careers, work experience, and academic learning. Consistent with other education reforms, current STW approaches seek to avoid tracking and the resulting creation of class distinctions among school-aged youth, and, by emphasizing the integration of academic and career education, seek to increase “real-world” experiences for all school-aged youth.

STW reformers have also learned from the experiences of cognitive scientists who have demonstrated that learning is often most effective when done in a meaningful context. Proponents of “contextual” or “authentic” learning have long argued that mainstream classroom teaching failed to teach students the types of social and intellectual skills required in the workplace, thus leaving youth ill-prepared for entry into careers (Resnick, 1987; Raizen, 1989; Sticht, 1989). As Dayton (1997) notes, early exposure to careers provides perhaps the most comprehensive and meaningful context available to illustrate to students the relevance of their academic subjects. For these reasons, school-to-work programs seek to combine classroom-based learning with work experiences.

They also draw upon many other educational innovations such as inter-disciplinary and team teaching, portfolio-based instruction, and block scheduling.

The STW vision as it currently stands has thus evolved greatly over the past decade to include at a minimum the following common elements:

- Emphasizing *system-building*, leveraging and redirecting funds to build a coherent system.
- Involving *partners* from business, labor, community organizations, and government in providing work-based opportunities, material assistance, and input on curriculum and outcome standards.
- The *articulation* of learning across different levels of education.
- The use of *career majors* and the *elimination of tracking* and the replacement of tracks with thematic and practical curricula which integrate work-based themes.
- The use of *active learning* methods. These include pedagogical approaches that emphasize contextual, experiential, and cooperative learning.
- Targeting *all students*, regardless of employment or college plans.

Rather than having a two-tiered educational system with high-standards of academic preparation for some and low-standards, STW initiatives encourage schools to provide all students of the opportunity for challenging, relevant academics and encourage local community partners and businesses to involve students in important work-based learning experiences.

A well-implemented approach to skills education introduces all students to career opportunities through a combination of school-based and work-based activities and learning experiences. Students, after graduating from high schools with well-implemented STW programs, would therefore have multiple options including college, technical training, and skilled entry-level work on a career path. The expected result of STW initiatives would be that students would be better prepared for college, careers and citizenship than during previous periods.

In the following section, we discuss several models of STW. Although the discussion below is not intended to detail all of the elements that comprise STW systems, it offers a sampling of the variety components upon which school-to-work systems can draw.

MODELS OF SCHOOL-TO-WORK IMPLEMENTATION

Current STW initiatives not only reflect an orientation toward meeting workplace requirements, but also toward providing students with greater access to labor market information, career guidance, and counseling for students of *all* grade levels and perceived abilities. To achieve these goals, the federal and state STW initiatives encourage a variety of strategies including “school-based” and “work-based” opportunities.

Following Stern et al. (1995), models of STW reforms can also be conceptualized as “school-for-work” and “school-and-work” programs. School-*for*-work programs are those that provide instruction for the explicit purpose of preparing students for work, such as Tech Prep and career academies. The category school-*and*-work encompasses programs such as youth apprenticeships, school-based enterprises, and cooperative education, which allow students to work and attend school at the same time. Clearly, although some of the STW transition programs in our sample draw heavily on one particular model or strategy, others seek to combine aspects of both types, creating “hybrid” programs at schools linking school to the workplace (Pauly, Kipp, and Hamison, 1995). In the following sections, we provide some examples of prior STW interventions that incorporate elements of work-based, school-based, and “connecting” career development strategies.

Although space limitations preclude an exhaustive review of all types of STW programs, we concentrate on some key aspects of five STW models that reflect differences of strategy and partnerships required for effective implementation. We discuss some salient results of previous studies, evaluate the strengths and weakness of each model, and consider some of the obstacles to replication.

Tech Prep. Tech-Prep initiatives seek to develop articulated programs of four years of sequential course work in specific fields such as business, health, engineering, and agriculture. Tech-Prep participation typically begins during the last two years of high school and continues with two years of postsecondary education. The Tech-Prep approach received wide attention after the publication of the *Neglected Majority* in 1985. In this book, Dale Parnell advocated a restructuring of general education curricula and substantive program coordination among high schools and community colleges. The primary goal of Tech-Prep was to build proficiency in mathematics, science, technology, and communications skills within an applied setting that would lead directly to a specified associate degree program and subsequent placement in employment. Many of the

strategies proposed by Parnell were subsequently adopted in the Tech-Prep Education Act.⁵

Carolyn Dornsife (1992) identified stages of Tech-Prep development along four dimensions: course articulation and curriculum development, career guidance, program evaluation and improvement, and marketing of the program. During early implementation, for example, education partners may begin by articulating currently existing courses in vocational and technical areas, modifying courses and course sequences during an intermediate implementation period, and eventually articulating new courses or course sequences that may include designation of “core” vocational and academic curricula.

Other researchers associated with the National Center for Research in Vocational Education (NCRVE) have identified obstacles to Tech-Prep implementation. Layton and Bragg (1992) note the difficulty of involving numerous partners in Tech-Prep consortia. Bragg (1992) details the problems involved with integrating academic and vocational curricula, particularly when Tech-Prep is isolated from mainstream educational programs. Bragg, Layton, and Hammons (1995) also point to the lack of time and resources devoted to Tech-Prep implementation and joint planning by secondary and postsecondary faculty members. Also, because the additional earnings derived from graduating with a bachelor’s degree are substantially higher than those for associate degrees, it is important not only to involve two-year colleges, which account for the large majority of postsecondary Tech-Prep partners, but four-year colleges as well (Grubb, 1993; Stern et al., 1995).

Career Academies. A career academy is a “school-within-a-school” that provides students with a three- or four-year program integrating academic learning with the study of a specific industry. The three most well-known academies—the Philadelphia academies, the National Academy Foundation academies, and the California Partnership Academies—serve a total of over 20,000 students (Raby, 1995). A number of career academies have also joined Tech-Prep consortia (Bragg, 1995).

Students in an academy are often grouped together for many of their high school courses and work under a small number of academy teachers during their course of study. The academic curriculum draws heavily from the academy’s occupational field, and instructional techniques emphasize “hands-on” work and team projects. Local employers

⁵ These are described in section E of the 1990 amendments to the Carl Perkins Act, U.S. Department of Education, 1990.

also provide work and mentoring to students during summer internships in the academy's field of specialization (Stern, Raby, and Dayton, 1992; Pauly, Kopp, and Hamison, 1995).

Although some career academies target a range of students, many, such as the state-sponsored California Partnership Academies, have been designed to serve students at risk of not finishing high school. Students are often economically disadvantaged and have records of irregular attendance, low grades, and a low level of interest in the school's regular academic program. At the same time, most academy curricula are designed to be rigorous, and students must demonstrate an interest in academy programs before they are admitted. They must also indicate a willingness to change study and attendance habits, as well as a motivation to begin on a career path.

Despite the fact that the course of study offered in academies is often more demanding than in regular high schools, relatively few students leave these programs, especially when recruitment processes are well implemented. When jobs or internships are not available, however, students may become quickly disillusioned with the program. Therefore, cultivating good school-business partnerships is a critical element in determining a career academy's eventual success (Stern et al., 1992).

Youth Apprenticeship. Youth apprenticeship programs provide another example of an intervention designed to bridge the gap between high school, postsecondary education, and work. Although some authors have described youth apprenticeship programs as extensions of the Tech-Prep model (e.g. Kazis and Roche, 1991), there are some important differences between these models—particularly in the relative emphasis of each on school-based and work-based acquisition of knowledge and skills. Inspired by the German apprenticeship system, youth apprenticeship programs seek to use the workplace as the major focal point for learning. Students learn technical skills and related skills in math, science, and problem solving related to specific industries such as health care, machining, electronics, or hotel services.

Unlike traditional U.S. apprenticeship programs, which generally target workers in their late twenties and are designed to serve the labor needs of specific industries, youth apprenticeship programs are designed to be an important part of the basic education of adolescents. In practice, programs vary in their focus as well as in their degree of independence from the high school (see Roditi, 1991 for a classification scheme). Most youth apprenticeship programs have the following in common: (1) a strategy to target a broad range of students; (2) curricular content that integrates academic and vocational education; (3) a significant portion of education that includes on-the-job learning and

experience; and (4) the granting of recognized credentials upon completion of the program (Bailey and Merritt, 1993). Youth apprenticeship programs also offer the advantage of allowing youth to apply the skills learned in school that they might otherwise forget by the time they entered stable “career” jobs in their mid-to-late twenties (Hamilton, 1990).

Successful implementation of youth apprenticeship programs, however, depends heavily on the participation of businesses. According to one estimate, to create apprenticeships for 15 percent of 16 to 20 year olds, one-fifth of U.S. businesses would have to offer youth apprenticeship positions (Olson, 1993). Widespread replication of youth apprenticeship programs will therefore require time and increased incentives for business to participate (Bailey and Merritt, 1993).

School-Based Enterprises. School-based enterprises (SBEs), defined as class-related activities that engage students in producing goods or services for sale or use to people other than the participating students themselves, were found in 18.6 percent of secondary schools in the U.S.⁶ In one process study of sixteen SBEs (Stern et al., 1994), the authors concluded that students derived much greater educational value from SBEs than they did from combining school with their off-campus jobs. The quality and meaning of work for students in SBEs described in this study, for example, stands in contrast to the repetitive summer or after-school jobs documented in such accounts as *When Teenagers Work* (Greenberger and Steinberg, 1986). Students surveyed on the differences between SBEs and non-school-based jobs indicated significantly greater use of knowledge and skills acquired in schools and more opportunity to learn valuable skills (Stern et al, 1992).

Unlike youth apprenticeships and career academies, which require that employers provide positions, school-based enterprises require no such direct participation by businesses in their operation.⁷ But because SBEs are legally owned by school boards and operated by the school’s principal and faculty, they do require a substantial investment of school time and resources. Planning a SBE requires careful consideration of a number of factors such as deciding on the types of product or services to be offered, setting appropriate prices, avoiding competition with local businesses, and recruiting staff and students. Additionally, although strong arguments can be made for the educational

⁶ This definition is taken from the 1992 National Assessment of Vocational Education (NAVE) survey. Results are reported in Stern (1992).

⁷ Local businesses do, however, offer a variety of technical assistance to some enterprises. In other cases, SBEs receive foundation grants.

benefits of SBEs, they may be less effective than non-school-based-jobs in imparting skills such as money management (because many SBE jobs are unpaid) and giving students the opportunity to broaden social contacts within their communities (Stern *et al.*, 1992; Stern *et al.*, 1995).

Cooperative Education. Cooperative education is by far the most widespread activity combining school and work activities in the U.S.—nearly half of comprehensive and vocational schools reported having such programs, and an estimated 8 percent of high school juniors and seniors in the country participate in co-op education programs (U.S. General Accounting Office, 1991; Stern, 1992). Recognized by federal authority since 1917, cooperative education provides vocational education for individuals through written cooperative agreements between schools and employers. Students receive instruction that includes required academic courses and vocational training, alternating study in school with a job in an occupational field. Representatives of the school and employers supervise students, so that each individual contributes to the student’s education and employability. Local partners determine the appropriate mix and scheduling of school and work activities (U.S. Department of Education, 1990).

Goldberger, Kazis, and O’Flanagan (1994) have detailed effective practices in cooperative education. They include (1) obtaining a written training agreement between schools and employers that describes the expectations of each partner; (2) a collaborative effort involving the student to develop a written training plan; (3) establishing a clearly articulated role for the co-op coordinator, including duties such as job development, placement, negotiating training plans, and monitoring students on the job.

Co-op graduates are much more likely to take jobs immediately after high school—and much less likely to attend postsecondary institutions—than are non-co-op graduates (New York State Department of Education, 1990; General Accounting Office, 1991). They are also more likely to express higher levels of job satisfaction than are non-co-op graduates, to find jobs that fit their career interest, and to receive on-the-job training (Walsh and Breglio, 1986; Herrnstadt, Horowitz, and Sum, 1987). Many studies, however, have failed to find clear evidence of a positive relation between co-op participation and subsequent economic outcomes in terms of higher labor participation or wages (e.g. Lewis, Gardner, and Seitz, 1983; Bishop, Blakemore, and Low, 1985). One study found that when graduates remained with the same employers they had in high school, co-op participants had significantly higher earnings than did non-participants. Co-

op graduates had no advantage over non-co-op graduates, if they changed employers (Stern and Stevens, 1992).

A SUMMARY OF WASHINGTON STATE'S STW INITIATIVES

By the late 1980s, many business leaders and policy-makers in Washington State had arrived at the consensus that, without substantial investment in education and training, the state would begin to lose its competitive position within the rapidly expanding Asian-Pacific economy. The public debate on STW was expanded in the state in 1988, with the publication of the State Economic Development Board's long-term development strategy, which advocated an education and training system based on "core competencies." The report's central claim was that decisive action was needed in order to provide the state with a well educated, skilled, and flexible workforce. This opinion gained further support after the state's Advisory Council on Investing in Human Capital released the results of its 1990 study that demonstrated that the lack of trained workers kept many businesses from expanding or developing new products (Lowry, 1995).

By the 1990s, STW initiatives in the state broadened their scope against the background of a generalized education reform. In particular, 1991 proved to be a watershed year for STW. During that year, four major actions reinforced the STW movement.

- The state legislature voted to mandate the integration of academic and vocational education.
- The governor created a Commission on Student Learning to define specific benchmarks and assessment tools to measure skills and knowledge at certain grade levels.
- The Workforce Training and Education Coordinating Board (WTECB) was formed to coordinate the state's education and training system.
- The governor convened a Council on Education Reform and Funding.

The Council Education Reform and Funding recommended a ten-point program for STW with the following goals:

- 1) Building a *school-to-work transition system* on the foundation of successful school reform to maximize the educational and career opportunities of young people.
- 2) Broadening the development of *work-based learning* that is coordinated with what students are learning in school.

- 3) Expanding and accelerating the development of *industry-defined skill standards* that define what students must know and be able to do to qualify for today's occupations.
- 4) Encouraging the development of *educational pathways* that customize high school students' course of study and integrate academic and occupational education.
- 5) Increasing *business and labor participation* in the development and implementation of school-to-work transition activities.
- 6) Building a *single, statewide system* by linking and expanding the base of local school-to-work transition activities.
- 7) Integrating statewide school-to-work transition responsibilities and *institutionalizing partnerships* into existing efforts and institutions.
- 8) Addressing the needs of *special populations* that are currently under-represented in technical training programs, higher education, and high-wage work.
- 9) Creating a sustained, coordinated *public information campaign* to raise public awareness about the need for a school-to-work transition system for our young people.
- 10) *Increasing funding for STW* through submission of a School-to-Work Opportunities Development Grant proposal to the federal government for the 1995 funding cycle.⁸

Implementing the School-to-Work Transition

STW implementation in Washington State was furthered by the 1994 passage of the School-to-Work Opportunities Act by the U.S. Congress.⁹ In 1995, Washington State was awarded a five-year, \$27 million federal grant to enable local communities to create School-to-Work Transition initiatives, and for state-level partners to assist with system-

⁸ The Council on Education Reform's recommendations were adopted by the legislature in the Education Reform Act of 1993 (ESHB 1209) which established four goals for improving student achievement. The fourth goal contained specific language related to STW, namely that students "understand the importance of work and how performance, effort, and decisions directly affect career and educational opportunities." Goals cited from Governor' School to Work Council, Final Report, 1995 (<http://www.wa.gov/wtb/stw-rept.html>).

⁹ Some impetus for states interested in promoting STW had been provided by the 1990 amendments to the Carl Perkins Act which stressed the integration of academic and vocational curricula while also providing federal support for the articulation of high school and college curricula within Tech-Prep programs (U.S. Department of Education, 1990). The 1994 School-to-Work Opportunities Act (STWOA), however, greatly reinforced these goals by requiring the integration of school-based and work-based learning, academic and vocational curriculum, and the creation of formalized links between secondary and post-secondary educational institutions.

building activities. By 1997, cumulative investment in School-to-Work (STW) activities mandated by House Bills (HB) 1820 and 2359, totaled more than \$4 million dollars (Owens, 1997). As part of a comprehensive education reform plan, students in schools participating in STW activities are to be exposed to a broad range of work- and school-based activities designed to enhance their future career opportunities. Central to Washington State's comprehensive STW transition system is the development of strong partnerships among business, labor, and educators.

Currently, approximately three-quarters of the state's school districts have begun to implement STW initiatives. Student participation in STW in Washington State has expanded greatly in the past five years. According to a recent study conducted by NWREL, there were 1,917 students participating in mentoring programs and 28,554 students participating in career explorations in 1994-95. By 1996-97, these numbers had increased to greater than 7,500 and 150,000 students respectively (Owens, 1997).

Another major strength of Washington's approach to STW is that it builds on the foundation of a strong and integrated program of school reform. Indeed, one of the stated goals of the school reform initiative is to maximize both educational and career opportunities for youth. Schools are encouraged to develop new approaches to teaching, such as promoting educational pathways and integrating academic and occupational education. At the same time, the educational system, which is itself subject to a wide range of political and social mandates, can do little in isolation. For this reason, the active participation of the business community is crucial in establishing skill standards.

Washington's STW initiative is also designed to promote equity through addressing the needs of special populations that are currently underrepresented in technical training programs, higher education, and high-wage jobs. Here again, business, labor, and community organizations—as well as schools—can all make an important contribution by making educational programs and work-based learning opportunities available for all students.

Previous Research on Strengths and Barriers to Implementation

Earlier evaluations of Washington State's STW transition have pointed out a number of strengths of the emerging system and have cited areas where further improvement of the system is desirable (Owens, 1995, 1997). As part of the most recent of these evaluations, an NWREL research team administered written surveys and conducted a number of site visits.

Survey results indicated that a statistically significant growth had occurred between the pre- and post- intervention (receipt of STW grants), as reported by grantees in the key areas of emphasis. Over half of districts also reported business and community involvement in a variety of areas.¹⁰ Comparisons of the 1994-95 data with those of 1996-97, researchers noted that (1) more students were participating in STW activities; (2) staff development opportunities had increased, allowing more teachers to demonstrate the relevance of academic content to the workplace; (3) the awareness of labor organizations and their involvement in elements of STW had increased; and (4) districts exhibited a greater tendency to treat STW as a framework for general education reform for all students rather than as special programs for only some students.

As part of the NWREL evaluation, a second wave of site visits was conducted during the 1996-97 school year at seven sites. These included four school districts, one consortium, and two extended-day programs for out-of-school youth. All programs had been implementing STW programs for at least three years. Although the researchers did provide some general assessments of the current state of STW in these schools, which are discussed briefly below, in the absence of cross-cutting analysis based on their site visits, it is difficult to deduce trends concerning the dominant mode or strategy of implementation. Nonetheless, a reading of individual cases shows a variety of key STW elements in some of the sites, including the following:

- The establishment of *career pathways*.
- The use of *portfolio-based assessment*.
- The existence of *articulated agreements* and *Tech-Prep* programs.
- A variety of *work-based learning* opportunities.
- Student *internship* and *job shadowing* opportunities.

Overall, the research team found a greater acceptance and understanding of STW after three years of implementation. Site researchers noted strengths and areas of concern among their case study sites. Of the strengths and improvement over the initial

¹⁰ Key emphasis areas of the STW transition included the (1) integration of vocational and academic learning; (2) career pathways; (3) career and academic counseling; (4) learner goals and performance; (5) partnerships; and (6) active participation of educators. Business and community involvement included (1) providing assistance in curriculum development and establishment of program outcomes; (2) promoting Tech Prep; (3) supporting staff development; (4) providing speakers for career days; (5) establishing student awards or scholarships; (6) providing material assistance; and (7) offering student internships.

implementation noted, two stand out: (1) the substantial efforts made to expand STW to middle and elementary schools as part of a comprehensive K-12 system; and (2) the commitment by school districts for staff development and the building of partnerships with businesses.

The greatest areas of concern noted by NWREL researchers included the following: (1) an insecurity concerning future funding; (2) an incomplete integration in some schools between vocational and academic learning; and (3) difficulty in some rural schools to implement STW due to lack of sufficient elective courses to support a career path model and lack of a diversified employer base and long distances to employment, which hindered work-based opportunities.

As a result of their analysis of survey and site visit data, NWREL researchers made the following recommendations for improvement:

- The need to overcome the *perception that STW is appropriate only for students intending to go directly to the workplace* after school.
- The need for improvement in *integrating* STW activities between elementary, middle, and secondary schools.
- The importance of *increased staff development* opportunities.
- The need to identify alternative sources of funding to enhance *sustainability*.
- The need for schools and districts for continuous *monitoring and benchmarking* (Owens, 1997, italics added).

As will be discussed in greater detail in Chapter III of this report, some of the concerns cited in the NWREL evaluation are confirmed by our survey of STW coordinators. What is clear from our research as well as these earlier evaluations, is that a growing consensus is developing in Washington State that STW is appropriate for *all* youth, rather than only students deemed unlikely to attend or complete college.¹¹

¹¹ Crucial to the success of STW transition is that parents and students *not* view STW as only for non-academically inclined students. Results from SPR's Washington State school survey indicate at least moderate parental support for STW reforms. When school STW coordinators in our sample were asked to comment on barriers to implementation, over half responded that negative attitudes among parents were not barriers to STW implementation and only 7 percent perceived negative parental attitudes as a serious barrier (D'Amico and Wiegand, 1998). These findings are corroborated by a recent survey of adults in which 74 percent responded that careers and the skills necessary to succeed at work should be introduced to students before high school, 87 percent responded that high schools should provide career preparation to every student before they graduate, and 96 percent believed that an education system that includes School-to-Work Transition is "highly desirable" or "desirable" (quoted from "School-to-Work Transition

Although there certainly continue to be some barriers to implementation, by the year 2000 STW is mandated for all districts of the state. Strong bipartisan support for STW in the legislature, wide agreement among key partners on the goals and objectives of the STW initiative, and extensive prior experience with a variety of STW strategies all provide a strong foundation for the state's STW transition efforts.

CONCEPTUAL FRAMEWORK FOR THE EVALUATION

Our conceptual model, presented in Exhibit I-1, views students' educational and employment outcomes as a function of the characteristics of STW systems in the high schools they attend. The principal hypothesis is that students leaving schools that have better developed STW systems will be better established on a career path within a year after leaving school than exiters from schools with less developed programs.

Categorizing Schools along Program Dimensions

In understanding the relationship between STW initiatives and outcomes, we will categorize schools with respect to their implementation capacity, nature of partnerships, strength of work-based and school-based implementation, and dominant program strategy. In making these categorizations, we have focused on the five stated goals of the state's STW initiative that apply to *individual schools*. These are summarized below:

- Supporting changes in school-based learning, including efforts to integrate academic and occupational education.
- Making work-based learning opportunities available to all students.
- Developing strong and broad partnerships, especially by increasing the involvement of business and labor.
- Development of connecting activities that link schools, students, and the workplace.
- Promoting universal access, including addressing the needs of special populations.

As shown in the figure, key variations in STW systems that are treated as proximal determinants of students' outcomes include the: (1) stage of implementation, which in turn is viewed as a function of the *extensiveness* or breadth of student participation, the *intensity* of student participation, and the *quality* of the STW experiences for students;

in Washington State, <http://www.wa.gov/wtb/stw-what.html>; Elway Research Inc and Davis Tietze and Co., 1997).

and (2) the *type* of intervention or *dominant strategy* (e.g. does the school rely primarily on school-based or work-based components).

As the figure also shows, we believe that the availability of well-developed systems offering intensive and high quality STW experiences are influenced by the *capacity* of the school to implement STW transition activities and the *strength and nature of local partnerships*. Key elements of implementation would in turn be influenced by a number of pre-existing conditions, such as characteristics of the local labor market and other school characteristics. For example, previous research has suggested that the aggressiveness with which schools pursue school-to-work relates to the achievement levels of their students, the minority composition of the student body, proximity to urban labor markets, and the student/teacher ratio, among other things (e.g., Visher et al., 1998; Maxwell and Rubin, 1998).

Implementation Capacity. We defined *capacity for implementation* primarily in terms of financing for STW activities. Specifically, we were concerned with how long the school's STW efforts had been formally underway and whether schools had received STW funding. For example, the year in which funding was first received and history of related program involvement provide measures of how much energy has already been expended in implementing school-to-work programs. Similarly, the size and period of the grant may provide a measure of the extent to which a school will invest energy in implementation—smaller grants (as measured on a per-student basis) may result in smaller, more limited programs. For these reasons, we were interested in the following indicators of implementation capacity:

- Year in which funding was first received for school-to-work (either planning or implementation) activities.
- The period of the school-to-work grant.
- History of involvement in STW and related workforce development programs, such as Tech Prep or Running Start.

Partnerships. Partnership involvement provides us with a measure of the support schools receive to implement their STW program, including both the number and types of partners that were available for assistance and the contributions made by these organizations. In looking at partnerships, we wanted to understand the *nature* of partnerships that schools had developed with businesses, labor organizations, and local government and community organizations, as well as to assess the relative *strength* of each of these partnerships.

In assessing the nature of partnerships, we were interested in the extent to which various types of partners offered opportunities to enhance the schools' STW efforts. Their strength is reflected by the number of partners and qualitative assessments of the effectiveness of partners' contributions in the following areas:

- Support for articulated agreements with postsecondary institutions or agreements that allowed for dual enrollment.
- Support for internship, community service, or volunteer opportunities for students.
- Support for the development of skills standards, curricula, assessment tools, or outcome standards.
- Support in providing professional development opportunities for teachers, participation governance and oversight of STW programs, and providing financial or other resource contributions.

Strength of Implementation and Dominant Program Strategy. Differences in capacity and strength of partnerships, we reasoned, would account for variations in school-to-work implementation, including the *strength of implementation*—as reflected in the *extensiveness*, *intensity*, and *quality* of STW activities—and the *dominant program strategy*. Extensiveness of activities can be measured by the variety of types of available to students and the percentage of the seniors participating in school-based or work-based activities. Intensity of activities can be thought of as a function of duration of time during the year that students participated in these various activities. And quality is reflected by certain bellwether indicators, such as, for work-based activities, the percentage of students having a written training plan, a workplace mentor, and the possibility to earn a certificate of mastery, and, for school-based activities, whether schools offer advanced placement classes and college credit, or cluster classes in math, English, social studies, and science for those with a common career major. Finally, dominant program strategy is a reflection of whether the school has primarily implemented work-based or school-based learning strategies, or a combination of the two.

The capacity for implementation and nature of partnerships are viewed as key determinants of the strength of implementation and the dominant STW strategy. For example, the choice of strategy may be influenced by the school's history of involvement with vocational education, in that schools with (for example) well-developed pre-existing cooperative education agreements with employers or Tech Prep programs may choose to build on them rather than developing new designs for its STW system. Similarly, stronger partnerships with business may make it easier for schools to develop work-based

components, while strong partnerships with postsecondary institutions may facilitate the development of school-based components.

Exogenous Factors

A number of exogenous factors may be confounded with or determine STW implementation, including socioeconomic attributes of local areas and other characteristics of schools. Because job opportunities for youth—including both work-based learning opportunities and post-school employment prospects—are dependent in large part on local labor market conditions, we include in our model community characteristics such as the local unemployment rate and earnings levels in the area. School-level characteristics will also be important, such as the student body composition, pre-existing achievement levels of students, and faculty/student ratio. Each of these characteristics may provide measures of constraints or factors that enable positive student outcomes; each may also be related to the strength or nature of school-to-work implementation, as discussed above.

Student Outcomes

The conceptual model guiding our evaluation is based on analyzing effects of the school-to-work transition for *all* youth, including both the college-bound and the non-college bound. Key hypothesized outcomes that might be associated with STW implementation thus include employment-related outcomes, such as rates of joblessness and earnings among those employed, attitudes and opinions about careers and work, and education-related outcomes, including rates of postsecondary school attendance. Employers' satisfaction with their new workers might also be impacted, as former students enter the work world with enhanced academic skills and better thinking skills and other SCANS competencies.

II. RESEARCH DESIGN AND DATA COLLECTION

Given Washington State's financial outlays to support school-to-work system development, policy makers have a clear and compelling need to know whether its investment seems to be paying off. The evaluation of which this report is a part was funded with this need in mind. However, quantifying an estimate of program impacts—as opposed to providing merely anecdotal evidence—is exceedingly difficult for an intervention as complex and multi-faceted as school-to-work systems should ideally be. In this chapter, we review some of these difficulties before describing the technical approach that we have adopted. We next detail the data collection activities associated with the evaluation and present our analysis methods.

SOME COMPLICATIONS IN ESTIMATING THE IMPACT OF STW SYSTEMS

In developing impact estimates, the objective is to isolate the effect on outcomes that can be uniquely attributed to the intervention in question. Developing such estimates for social and education programs is intrinsically difficult, for reasons that relate to the complex dynamics of interpersonal relationships and social systems, the often weak or incomplete theoretical understanding for how those systems operate in the real world, our inability to study social phenomena under controlled conditions, and the paucity of data and limitations of measurement instruments.

But estimating the impact of school-to-work systems is even more difficult for reasons that go beyond these. To begin with, social scientists are best able to isolate program impacts when the intervention is clear and well-defined, while school-to-work systems are anything but. Instead, school-to-work entails multi-faceted systemic reform, involving changes to pedagogics, the locus of instruction, course content, performance standards and assessment methods, and partnerships. In fact, there is not clear agreement on what school-to-work even is or what the minimum requirements for well-developed systems are.

Partly as a consequence, there are wide disparities in how school-to-work is being implemented in different school districts and consortia within the state (e.g., Owens, 1995), not to mention within the nation as a whole. Thus, some schools attempt schoolwide restructuring, and others only partial or limited restructuring. Similarly, some embrace the model of career academies, others Tech Preps, and others youth apprenticeships, among just some of the common variants. Long-standing elements of

vocational instruction are also being adapted and are thrown into the mix, including cooperative education and school-based enterprises. Moreover, in practice most schools in Washington and across the nation have adopted hybrids, borrowing elements from different models and assembling them in unique combinations (e.g., Pauly, Kopp, and Haimson, 1995), often in response to unique local circumstances. Finally, the specifics of implementation when seen from the vantage point of the individual youth participants vary markedly, relating (for example) to the sequence of courses youth take, the nature of their work experience assignments, who their mentors are, and so on. These differences represent important nuances of design that cannot be easily captured or isolated when one is interested in knowing in a broader sense whether school-to-work is effective or not. Indeed, under such circumstances, school-to-work is not one thing but many, and even well developed variants may look very different—with potentially very different effects on young people—depending on the specifics of the design.

Related to this fluidity, school-to-work systems have been evolving rapidly over the last few years. The infusion of state and federal STW funds into Washington's schools, coupled with the commitment that many school administrators and teachers have made to embrace school-to-work reforms, mean that the period during which our study was conducted has seen many of Washington's schools transform themselves markedly (Owens, 1997). A cohort of students entering 9th grade in, say, 1993, might consequently see their exposure to school-to-work elements change in dramatic and unexpected ways, as their schools go through different stages of implementation. More generally, the implementation of school-to-work, as all new reform initiatives, has experienced its share of start-up problems, including the need to develop new curricula, the slowness with which some teachers embrace new teaching strategies, the need for staff development, the need to recruit employers and work sites, and so on (see, for example, Ramsey et al., 1995; Schmidt, Finch, and Faulkner, 1995; Pauly, Kopp, and Haimson, 1995). Moreover, schools have also experienced changes in their curriculum and pedagogy as a result of other, only loosely related, school reform initiatives that have been taking place simultaneously (e.g., those relating to tightened academic standards). Isolating the impact of school-to-work interventions under such circumstances is potentially highly misleading.

If school-to-school variability in the nature of the treatment varies greatly, intra-school variation is substantial as well. Thus, within each school building students differ in precisely to what school-to-work interventions they have been exposed. Simply defining who is a participant in a school-to-work program is itself not clear-cut. Just as importantly, the selection mechanisms are usually not well known, and, in the absence of

random assignment, cannot be easily controlled. For example, the types of students targeted for school-to-work can vary greatly from school to school—including those identified as being “at-risk,” the non-college bound, the middle 50%, and so on—despite the fact that school-to-work is ostensibly for everyone. Very often students can elect to participate in various elements (e.g., to participate in a worksite experience) or are assigned by their counselors, so additional selection mechanisms come into play, perhaps relating to motivations or perceived need or ability to benefit. Although a variety of strategies to correct for participant selectivity bias has been proposed (e.g., Heckman and Robb, 1985), none have gained widespread acceptance with the data that are typically available (Barnow, 1987). For these reasons, even if one could make a clear distinction between participants and nonparticipants within a given school, differences in outcomes between the two groups could be falsely attributed to the impact of the intervention when in fact they are generated by the underlying selection factors instead.¹²

Comparing outcomes between participants and non-participants within the same school also ignores the possibility that school-to-work efforts could have impacts on non-participants as well as participants. For example, the implementation of school-to-work could drain energy and resources that would otherwise be applied for other purposes. Similarly, the school climate, so important in determining students’ outcomes (see Coleman’s classic work, 1961), could be affected in fundamental ways with consequences for the achievements of all students, regardless of their level of participation.

These difficulties, including the potential biases introduced by selection factors and the difficulty of clearly defining participants and non-participants, have caused some researchers to question whether comparing the outcomes of different groups of students within the same school is suited for estimating the effect of STW under most circumstances (Glover and King, 1997). But more fundamentally, following the vision of the Governor’s Council on School-to-Work, school-to-work, if done as intended, should represent systemic change in which all students within a school are involved. As such, there should really be no such thing as a non-participating student in a school with a well-developed school-to-work system.

¹² An additional practical problem with this approach is that one would need extensive data about individual students, including data from high school transcripts, to adequately characterize the nature of the “treatment” that an individual student might have received as well as their prior achievements and course selection, and to control for possible confounding factors (e.g., those relating to potential selectivity mechanisms). Data of this sort were not available to us.

OVERVIEW OF A RESEARCH DESIGN FOR ESTIMATING STW IMPACTS IN WASHINGTON'S SCHOOLS

These are indeed formidable obstacles to estimating the impact of Washington's recent initiatives. Traditional evaluation methods in which one uses experimental or quasi-experimental designs to compare the outcomes within the same school environment of participants, who receive the "treatment," to non-participants, who do not, seem wholly inappropriate in this context. Instead, because schoolwide restructuring is the focus of Washington's efforts, we have adapted a design proposed by WTECB in which *school-to-school differences* in outcomes for entire exiting cohorts are examined as a function of the extent of *schoolwide* STW implementation. The effects of the school's school-to-work efforts are to be inferred if students in schools with more fully implemented STW systems record more favorable outcomes than their peers in schools with less developed programs, once other differences between schools are controlled. This design is a variant of one recently proposed by Burtless (1997), as part of a panel of experts convened by the National STW Office and the U.S. Departments of Labor and Education to suggest viable evaluation options.

Among the features of our design, we examine whether students in secondary schools with more advanced STW transition efforts are better established on a career path within a year after they leave school than are exiters from schools at earlier stages of STW implementation. We will perform this investigation for two cohorts of high school students—the 1995-96 (Phase I of the evaluation) and the 1998-99 (Phase II) graduating classes—drawn from approximately 65 separate schools. All schools in the sample will have implemented STW activities to some degree (i.e., there are no true "no-treatment" schools), but schools will vary appreciably in the degree to which they have done so. This report describes results from the Phase I data collection and analysis.

Consistent with the conceptual model presented in the previous chapter, the research design examines student outcomes as a function of school-level measures of school-to-work implementation, as well as exogenous factors that are to be controlled. Student outcomes that we study include:

- Whether the student attended postsecondary education, and the types of institutions they are attending (e.g., 2-year or 4-year schools).
- Employment and earnings.
- Attitudinal items measured from students, including students' assessment of their preparedness for work or further schooling, their satisfaction with the training they received while in school, their perceptions of career

opportunities, and (if employed) whether they feel their job makes full use of their skills and abilities.

- For employed students, work supervisors' appraisals of the students' work preparedness.

All outcomes have been measured approximately 12-20 months after the expected high school graduation date (e.g., outcomes for the 1995-96 cohort were measured in the summer of 1997 through early 1998).

Key determinants of outcomes are the characteristics of each school's STW programs, including those relating to the stage of implementation and resources for implementation. Three categories of control variables will also be included in the model. These categories of controls are:

- Student background characteristics, such as gender and race/ethnicity.
- Local labor market conditions, such as the unemployment rate and average earnings.
- School-level characteristics such as socioeconomic status (SES, as measured by the percent of students receiving free or reduced lunch), minority composition, and the student/faculty ratio.

By controlling for these other likely determinants of students' outcomes, the effects of school-to-work designs can be estimated more precisely.

One key feature of the design implicit in what has been described is that we are evaluating outcomes as a function of *school-level measures* of STW implementation. Thus, we are not analyzing outcomes for individual students as a consequence of the program of study (e.g., courses taken) each of them undertook, or even to specifically which of them participated in STW activities. Instead, school-level measures constitute the key independent variables, and they are being related to outcomes measured for entire exiting cohorts.

As noted above, this approach mitigates difficulties with participant selectivity bias and is perhaps best suited for examining the sorts of systemwide changes—as opposed to discreet, narrowly defined interventions—that Washington State is envisioning for its STW initiative. However, several potential difficulties with this approach must be noted. First, the effects of STW efforts are being deduced based on school-to-school differences in student outcomes, when in many schools few students might be participating in STW activities in any meaningful way. Of course, Washington's vision for STW is that all or most students should participate, and the extent of participation can thus be viewed as an

indicator of the completeness of each school's implementation. Indeed, Washington's school-to-work initiative is an effort to implement *system-level* change and thus to transform wholesale the previous way of doing things. It is entirely fitting, therefore, that outcomes should be estimated as a function of schoolwide measures of implementation.

Second, as the details of our design will make clear, we are making comparisons among only approximately 60 comprehensive high schools selected throughout the state. This means that we have relatively few unique data points with which to characterize school-to-work implementation, limiting the statistical power of the analysis.

A third potential difficulty is that school-to-school comparisons still do nothing to address complications caused by the multi-faceted nature of school-to-work systems. By examining whether the degree of school-to-work implementation in a very broad sense relates to students' outcomes, we are adopting a "black box" approach to social inquiry (Moffitt, 1997), largely begging the question of which features of STW systems might be effective and under what circumstances. Moreover, we must largely ignore the possibility that two schools at overall similar stages of implementation but adopting different designs (e.g., a youth apprenticeship model vs. career academies) might have very different impacts on students. Much hinges on the adequacy of our conceptualization of what well-developed systems look like. In other words, the fact that school-to-work is an amorphous and hazily defined intervention is not obviated by our approach.

Fourth, the internal validity of estimates of program impacts could be impaired to the extent that pre-existing differences between schools are not adequately controlled. We are especially concerned to the extent that schools in more advanced stages of implementation differ from schools with less well implemented STW programs in ways correlated with but not caused by STW implementation. For example, schools that are the first to embrace school-to-work are often those with lagging student achievements to begin with; conversely, schools whose students are more likely to be college bound often are more reluctant to embrace the STW model (e.g., Maxwell and Rubin, 1998). To this degree, schools that begin with lower rates of postsecondary attendance among their 12th graders might move to implement more complete STW systems as a way of boosting students' achievements. The changes they make might indeed improve student achievements substantially, but without entirely bringing these schools up to the level of their counterparts that were higher achieving to begin with. If one noticed that schools with lower rates of postsecondary achievements were just those that had more fully developed STW systems, one could be misled into thinking that STW was in some sense

the cause of the schools' lower achievements, when in fact the lower achievements are entirely due to pre-existing conditions that STW helped mitigate. To have confidence in our estimates of the impact of STW, it is thus imperative that important pre-existing differences between schools be adequately controlled. This in turn requires that we have strong data to adequately characterize these differences.

An alternative strategy for purging impact estimates of these pre-existing differences is to estimate *changes* in the schools' outcomes as a function of *changes* in STW implementation. The estimation of such change models is a well-known procedure for weeding out the effects of potentially confounding "fixed effects" across schools. Along these lines, a key feature of our design is that we will be able to make both intra-cohort and inter-cohort comparisons, with cohorts defined by the school year. For example, for Phase I of the analysis, we are making comparisons across schools as we measured them during the 1995-96 school year. As of that school year, school-to-work implementation as schoolwide restructuring was a relatively recent phenomenon, so few schools should be at advanced stages of implementation. This fact will serve to reduce variation on the key independent variables and potentially also on outcomes, thereby lessening our ability to detect significant effects.

Three years later, however, when the Phase II data collection has been undertaken for the 1998-99 school year, many more schools should have advanced STW programs. Because we will combine data that we collected from both phases of the study for the final analysis, the range of variation should be much greater, and the statistical power of our analysis will be enhanced accordingly. Additionally, having data on both outcomes and key inputs at two time periods enables us to estimate change models of the sort described above.

For these reasons, the clearest assessment of the impact of Washington's school-to-work initiative can only come when the Phase II of our evaluation is complete. This report, summarizing the Phase I results, should thus be viewed as establishing the baseline for studying the later changes.

SELECTING THE SAMPLE OF SCHOOLS

Among the first steps in implementing the research design was to select the sample of schools to be included in the study. WTECB took primary responsibility for this task, by drawing the sample of schools and contacting them to elicit their cooperation. SPR provided input to this process, by suggesting considerations that should be kept in mind in making sample substitutions or additions.

Ideally, schools would have been chosen to participate in the study using probabilistic selection methods. However, this strategy proved impractical, and schools were selected purposively for the most part, based primarily on whether they were already participating in the GFS, the chief data source on which the analysis of outcomes is based. Some school districts have been contributing to the GFS on a voluntary basis for some time. During the sample selection phase, WTECB made the decision to include only schools from among districts that already were contributing to the GFS, to minimize the additional burden that schools selected for the evaluation would be asked to bear.

Additionally, WTECB included in the sampling frame only districts that had been receiving federal or state STW implementation funds, on the grounds that schools not receiving special funding could scarcely be asked to burden themselves by participating in an evaluation of a program from which they were receiving no benefits.

Finally, WTECB also restricted the sampling frame to schools with at least 50 students in its 1995-96 graduating class. This restriction was made to ensure that outcomes could be estimated with reasonable reliability at the school level and also for reasons of greater efficiency of data collection.

Within these constraints, SPR also recommended a number of guiding principles for sample selection:

- To enhance the statistical power of the analysis, approximately equal numbers of schools should be chosen at early, mid, and late stages of implementation.
- To promote the external validity of the study's findings—the ability to generalize findings to the universe of the state's schools—schools included in the study should be broadly similar on key characteristics (i.e., apart from STW implementation, but including student body size, the mix of student demographics, geographic locations, etc.) when compared with schools in the state as a whole.
- To promote the internal validity of the study's findings—our confidence that effects we estimate truly are warranted for schools in our study—schools included in the sample should be well balanced along the continuum of implementation. Thus, for example, schools at higher stages of implementation should not differ systematically from schools at lower stages of implementation on other school characteristics (i.e., characteristics other than their STW programs), because otherwise it might be more difficult to disentangle the effects of STW implementation from other school-level attributes that may also impact student outcomes.

With these considerations as a backdrop, WTECB drew a final district sample and subsequently selected schools within these districts. This sample included 67 schools selected from 54 districts, and is mapped in Figure II-1, and the schools are listed in Appendix A. Fuller details on the sample selection process are included in a companion piece, *Report on the School Survey* (D’Amico and Wiegand, 1998).

DATA COLLECTION

As part of our evaluation, we have collected and analyzed both existing and new data. The new data collection has included a school survey, used to gather information about each school’s STW efforts, as well as student and employer surveys, from which key outcomes were measured. Existing data sources being used include the state’s Graduate Follow-Up Study (GFS), for measuring student outcomes and other attributes, and supplemental sources, such as those used for measuring labor market conditions and other characteristics of schools. These data sources will be briefly described.

School Survey

As noted, school-level measures of STW implementation and design will be related to students’ outcomes. For reasons discussed in Chapter I, two key dimensions to the survey captured information about each school’s capacity for undertaking STW efforts and its progress towards broadly defined goals associated with the state’s STW

workforce development initiative. Key elements of the survey thus elicited information about:

- When key STW activities were initiated.
- Extent of student participation in each of various school-based and work-based STW activities.
- Characteristics of school-based and work-based activities.
- Nature and extent of partnership involvement.
- Efforts made by the school to promote universal access.

Note that, because for Phase I we are examining outcomes for those who were high school seniors in the 1995-96 school year, we attempted to characterize schools as they would have been experienced by this cohort. Thus, all questions were worded with reference to them, including what school-to-work experiences this cohort would have experienced during their high school years.

Survey Design and Administration. A draft of the Phase I school survey that incorporated these elements was developed in late May 1997, shortly after our contract was awarded. This draft was reviewed by WTECB and the project's advisors, and was pilot-tested by the STW Coordinators at several selected schools. All reviewers were asked to comment on the survey with respect to its clarity, feasibility, and adequacy for capturing key elements of the schools' efforts. Based on the comments of all these reviewers, we made revisions to question wording and content. The final version was reviewed and approved by WTECB in mid June. A copy of the final survey is included as Appendix B.

Once the questionnaire was finalized, a printed copy was mailed to the School-to-Work Coordinator or Vocational/Technical Director at each school in our sample, who was expected to be the primary respondent. By the end of 1997, we had received completed surveys from all but 6 schools in our sample. The 61 schools that returned their surveys thus constitute the pool on which the results described in the remaining chapters of this report are based.

An Evaluation of the Final School Sample. To examine the representativeness of the school sample Table II—1 shows how schools included in the final analysis sample compare to the state's secondary schools as a whole and to secondary schools with a graduating class of at least 50 students, since the latter group conforms the comparison to one of our sample restrictions. Poor correspondence would suggest that the estimation of

impacts generated from the evaluation might not generalize readily to schools in the larger universe.

Table II-1
Comparison of Schools in the Sample To All Schools in the State,
on Selected School Characteristics

	Schools in Sample	Other Schools in State	
		All Others	Those w/ more than 50 Students
Size of 12th Grade Cohort			
1 to 99	18.4%	52.6%	25.4%
100 to 249	31.7	22.1	34.7
250 or more	50.0	25.4	39.9
Location			
East	33.3%	41.9%	30.6%
West	66.7	58.1	69.4
Urbanicity			
In a metro area	60.0%	55.9%	63.0%
Not in metro area	40.0	44.1	37.0
Percent Minority			
Less than 10%	33.3	44.5	38.7
10% to 24%	38.3	32.0	36.4
25% or more	28.3	23.5	24.9
Student/Teacher Ratio			
Less than 18	5.0	31.3	6.4
18 to 21	50.0	38.6	51.5
22 or more	45.0	30.2	42.2
Number of schools	60	272	173

Note: Schools in the sample represent those schools that returned a completed school survey, less one school that did not contribute information to the Graduate Follow-Up Study. The columns showing the characteristics of "other schools in the state" are restricted to schools not in our analysis sample but with a 12th grade class, excluding special schools and alternative schools; the final column is additionally restricted to schools with a 12th grade class of at least 50 students, as reported in the Common Core of Data. T-tests were used to examine whether schools in the sample are significantly different from other schools with fewer than 50 students in their senior class. None of the differences were significant at the .10 level. Data are from the Common Core of Data, available from the National Center for Education Statistics.

Fortunately, the correspondence is generally quite good. Looking across the first two columns only, the differences could have been anticipated—the state as a whole includes a much higher proportion of schools with a 12th grade cohort smaller than 100 students. A difference of this sort is inevitable given that the sampling frame for the evaluation excluded schools with fewer than 50 students in the graduating class. Thus, in interpreting the evaluation’s findings we must be cautious in extrapolating the results to the appreciable number of very small schools in the state. In any case, this difference in the sizes of schools that are being compared in turn gives rise to associated discrepancies. For example, because smaller schools disproportionately tend to be located East of the Cascades and in rural areas, and have fewer minority students and a lower pupil-teacher ratio, discrepancies along these lines emerge as well.

However, when schools in the analysis sample are compared with the state’s schools once those with fewer than 50 seniors have been omitted, the differences are very modest. Thus, the differences in size classifications that we noted earlier have been almost entirely eliminated. As a consequence, so have the earlier differences in all other categories of comparison. In fact, none of the differences between these two columns attains statistical significance at the .10 level. Thus, based on these results, the schools in our sample are quite similar on these basic characteristics to all schools in the state with at least 50 seniors, increasing the confidence in our ability to extrapolate the study’s findings.

The Graduate Follow-Up Study (GFS)

The GFS is an innovative and ambitious data-building exercise that has been undertaken by the State of Washington for recent high school exiters for the last several years. Each year, participating schools (participation is voluntary) forward to the GFS data manager lists of names and limited other information for 12th graders. The GFS data manager then conducts matches with Washington State’s Unemployment Insurance (UI) files and enrollment databases for Washington’s and adjacent states’ post-secondary schools. As a result, GFS provides:

- Limited information from each student’s high school records (e.g., basic demographics).
- Information from UI matches on whether each student worked at all in any of the quarters from July 1, 1996 (the start of the first quarter after this cohort’s expected high school graduation date) through June 30, 1997, along with information on hours worked during each of these quarters and quarterly earnings.

- Information on postsecondary participation, from matches with enrollment files, providing an accounting of whether each student enrolled in 2- or 4-year colleges, and areas of study for those in vocational fields.

With one exception, all schools selected for our study agreed to participate in the GFS and forwarded for matching the names of students who were 12th graders at the start of the 1995-96 school year. For these schools, the GFS thus provides post-high school employment and education information for high school exiters for the Phase I cohort, subject to several limitations. First, high school exiters who are enrolled in postsecondary school or employed in other states generally can not be matched, and thus will appear to be neither employed nor enrolled. Second, some persons may be employed in Washington in one of the small number of jobs not covered by the state's UI system. Rules vary from state to state, but those governing Washington exempt from UI coverage persons who are self-employed and those who are employed in family businesses or by churches and specified other nonprofit organizations or are door-to-door sellers paid solely by commission, among limited others (Washington State Employment Security, 1994). Persons employed in these sectors will not appear in the UI files and thus will not appear as employed. Similarly, some persons may be receiving postsecondary training within the state in non-covered institutions (e.g., trade schools, etc.).¹³

Finally, matches could not be attempted for the approximately 35% of high school exiters for whom their secondary schools did not provide Social Security Numbers to the GFS data manager. Usually this omission stemmed from the fact that the schools themselves were missing SSNs for some of their students.¹⁴

¹³ As a way of judging the potential undercounting attributable to these causes, results from the Student Survey (to be described below) were used to compare students' reported rates of employment and post-secondary school attendance with rates estimated from the GFS. These comparisons show very modest discrepancies, once differences in the time frames covered by the two data sources are taken into account (Wiegand and D'Amico, 1998a).

¹⁴ Many of Washington's schools are very sensitive to privacy concerns, as are many of the state's residents. Consequently, some schools do not request SSNs for enrolling students and some students do not provide them when asked to do so. The rate of missing SSNs varies greatly from school to school, ranging from a low of 0 percent to a high of about 70 percent for a few schools. In general, students without SSNs are more likely to be members of minority groups but have slightly higher Grade Point Averages. There is also a very small correlation across schools between the rate of missing SSNs and our measures of school-to-work implementation (which are developed in the next chapter). Consequently, the rate of missing SSNs is included in regression equations of STW impacts, to control for potential selectivity bias.

Student Survey

We have also designed and administered a survey that was administered to randomly selected students. The student survey provides the opportunity to both expand the range of outcome and other information available from the GFS and validate some of the existing GFS measures. Key topic areas include limited information about students' STW exposure while in high school; post-high school employment experiences; postsecondary education and training; and attitudes and opinions, including the student's assessment of his/her work preparedness and knowledge of the working world. A copy of the student survey is included in Appendix C.

For purposes of developing the sampling frame, the names of 35 students from each of the schools in the school sample were randomly drawn from the GFS. We then forwarded these names to the high schools the youths attended to get the students' mailing address and telephone number. Of the schools in our sample, 62 eventually complied with our request, for a total attempted student sample size of approximately 2,100. Telephone interviewing was conducted by Field Research Corporation, beginning in August 1997 and continuing through October of that year. Although refusals to the request for an interview were rare (amounting to only 5 percent of the total phone numbers called), telephone numbers were very often incorrect or inoperative. Targeted students who could not be reached by phone were mailed a hard-copy version of the questionnaire. Altogether, we received 851 completed interviews, either by phone or through the mail survey. The disposition of survey responses is shown in Table II—1. Fuller details on the survey administration procedures can be found in *Report on the Student Survey* (Wiegand and D'Amico, 1998a).

Employer Survey

As part of the evaluation, we also designed and administered an employer survey, providing the opportunity to elicit information about the students' work preparedness from another key stakeholder in STW implementation. The sampling frame includes the work supervisors of those respondents to the student survey who indicated that they were or had recently been employed since leaving high school (excluding those who were employed while also attending postsecondary school and who considered themselves primarily a student rather than a worker). These number 181 of the 851

Table II-1
Disposition of the Student Survey

	<u>Number</u>	<u>Percent</u>
Total contacts attempted (either by phone or mail)	2,090	100.0%
Total completed surveys	851	40.7
Completed phone interviews	361	17.3
Completed mail surveys	490	23.4
Bad addresses and phone numbers	457	21.9
Nonrespondents	782	37.4

Note: Bad addresses and phone numbers generally represent targeted respondents for whom the phone numbers we had were either not operative (e.g., phone disconnected, fax/modem) or at which the respondent did not reside, and bad addresses represent mailings that were returned by the post office as undeliverable and with no forwarding address. Nonrespondents represent those not in the other categories (e.g., mail surveys were not returned either by the post office or the respondent and where attempts at a phone interview met with no answer, answering machines, and the like).

student respondents. With the exception of just over a dozen employers for whom addresses could not be obtained, these employers were mailed a brief survey eliciting their opinions about the work preparedness of the individual from our student sample who had named them as their work supervisor. Specific questions related to the perceived adequacy of the worker's basic skills, SCANS skills, occupational skills, and general work habits. We obtained a response rate of 55.2 percent, resulting in just under 91 completed surveys. A copy of the Employer Survey is included in Appendix D; fuller details on the survey administration procedure can be found in *Report on the Employer Survey* (Wiegand and D'Amico, 1998b).

Miscellaneous Data Sources

The analysis of program impacts will be strengthened to the extent that we can control for school characteristics and characteristics of the local economy that can be expected to affect outcomes. The sources on which we draw for these measures are:

- The Common Core of Data (CCD), made available by the National Center for Education Statistics (NCES), provides basic information about each of the nation's schools and school districts for the 1995-96 school year, including the pupil-teacher ratio and minority composition.

- The ES 202 file, based on reports filed by employers, which presents for each county quarterly estimates for total employment and aggregate earnings, by industry.
- The Local Area Unemployment Statistics (LAUS), compiled from multiple data sources, which presents monthly estimates of the labor force status for cities and counties.
- The County and City Data Book, which builds on data from the 1990 Census and other sources to describe the general social and economic characteristics of cities and counties.

Exhibit II-1 shows a list of variables to be included in the study and describes the sources for the data.

Exhibit II-1
A Summary of Variable Measurement and Data Sources

Variable	Data Source
Outcome Variables	
Postsecondary Enrollment	GFS and Student Survey
<ul style="list-style-type: none"> - whether enrolled since leaving high school - type of institution(s) attended - quarters attended and credits earned - aspirations for highest grade completed 	
Employment Outcomes	GFS and Student Survey
<ul style="list-style-type: none"> - in which quarters employed, from July 1998 to - hourly wage and quarterly earnings - how student found job 	
Student Attitudes/opinions	Student Survey
<ul style="list-style-type: none"> - perceptions and knowledge of working world - assessment of work relatedness and preparedness - satisfaction with current job, including perception of opportunities for promotion 	
Employer Assessments	Employer Survey
<ul style="list-style-type: none"> - of student's general work maturity - of student's basic skills and SCANS skills - of student's occupational-specific skills - of what skills are needed for good performance 	
Independent Variables	
Measures of STW	School Survey
<ul style="list-style-type: none"> - implementation - strategies - partnerships 	
Student Characteristics	GFS
<ul style="list-style-type: none"> - demographics (gender, race/ethnicity) - special education status 	
School Characteristics as Controls	Common Core of Data, 1994-95
<ul style="list-style-type: none"> - location - size of student body - minority composition - faculty/student ratio 	
Pre-STW Measures of Outcomes	GFS (for Phase II only)
County Areal Characteristics	ES 202, LAUS, and the City/County Data Book
<ul style="list-style-type: none"> - industrial composition and earnings - poverty rate - unemployment rate 	

III. THE STATE OF SCHOOL-TO-WORK IN WASHINGTON

On the basis of the school surveys we have collected, as described in the last chapter, we have a rich source of data about the state of school-to-work implementation in the State of Washington during the 1995-96 school year. Through the survey responses, we can profile a diverse sample of schools in the state with respect to the intensity and extensiveness of school-based and work-based activities, the strength and nature of partnerships, and perceived barriers to more complete implementation. Full details on the survey results on these topics can be found in our companion paper, *Report on the School Survey*; in this chapter we summarize some of these findings before presenting our indices of implementation, which will serve as key predictor variables in our analysis of youth outcomes.

SCHOOL-BASED LEARNING ACTIVITIES

An essential feature of well-developed school-to-work programs is school-based learning activities. As defined by the School-to-Work Opportunities Act, these consist in the first instance of career assessment and counseling activities that enable young people to identify potential career interests, as a starting point for helping them embark on a program of study in secondary school that entails academic learning in a career context. Table III—1 suggests that schools have made substantial progress along these lines. Over three-quarters of the schools indicated that all or most seniors had undertaken a career interest assessment as part of their school program. The proportion of students who received individual counseling sessions to discuss career goals and college plans is not quite as uniformly high, but is still quite impressive—in almost 90 percent of the schools many or most seniors had the benefit of such sessions. All in all, this evidence suggests that career assessment or counseling, crucial first steps in well-developed school-to-work systems, are quite far advanced in the schools in our sample.

Beyond the assessment of career interests, school-based components as described in the School-to-Work Opportunities Act also consist of classroom opportunities provided to students that entail the integration of academic and vocational skills training and that promote high standards of learning within a career context. As part of our survey, we asked an extensive battery of questions about these components, including:

Table III-1
Extent to Which Schools Provided
Career Assessment and Counseling

How many 12 th graders had at some time been provided with:	Percent of Schools
A career interest inventory	
No students received it	0.0%
A few students	6.7
Many students	15.0
All or most	78.3
Individual counseling to discuss career or college planning	
No students received it	0.0
A few students	11.7
Many students	45.0
All or most	43.3

Note: Figures represent the percentage of schools who gave the responses indicated.

- Career academies. In the best examples, the so-called “school-within-a-school” organizes a high school curriculum around a career theme, usually for a subset of the school’s students. Students within an academy typically take many of their classes together for the last two or three years of high school, and even traditionally academic courses are imbued with career themes.
- Career majors or pathways. These models are like career academies in many respects, but expanded to be schoolwide. A typical high school might offer multiple career pathways, with each pathway consisting of a sequence of related courses. Pathways implemented in some of Washington’s schools include Health, Business and Marketing, and Industrial Technology.
- Tech-Prep, and other articulated agreements. Tech-Preps are 2+2 models that link the last 2 years of high school with 2 years of a postsecondary institution, and typically lead to the award of an associates degree; by virtue of the articulation agreements, students receive postsecondary credit or advanced standing for selected high school courses they have taken. These programs typically focus on preparing students for technical careers, while imparting sound academic skills.
- Youth apprenticeships. Although relying predominantly on work-based activities, youth apprenticeships also involve closely integrated classroom

instruction that may also provide postsecondary credit or advanced standing.

As Table III—2 shows, Tech Prep and related articulated programs were clearly the most common of these activities, and were in evidence in 79 percent of the schools. However, even though most schools had articulated agreements, relatively few seniors were participating. Career pathways, a school-to-work component that often entails substantial systemic change, were much less prevalent, but still had been established in 44 percent of the schools; where they were used, typically most students were participating, consistent with the notion of career majors as schoolwide reform efforts. By contrast, career academies and youth apprenticeships were quite uncommon and reach relatively few students even in the schools in which they operate.

Table III-2
Extensiveness and Intensity Measures for
Various School-Learning Activities

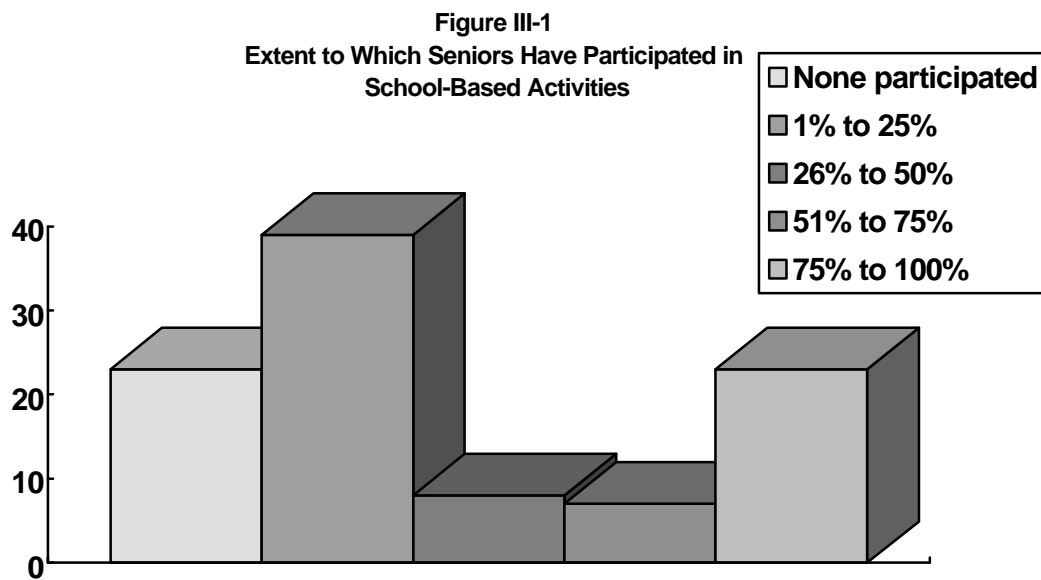
	<u>Career Academies</u>	<u>Career Majors</u>	<u>Articulated Programs</u>	<u>Youth Apprentice</u>
Percent of schools having this activity	11.5%	44.3%	78.7%	13.1%
Percent of seniors who participated				
None	88.5%	65.6%	32.8%	86.9%
1% to 25%	6.6	0.0	62.3	13.1
26% to 50%	1.6	8.2	4.9	0.0
50% to 75%	1.6	3.3	0.0	0.0
76% to 100%	1.6	23.0	0.0	0.0
Years elapsed since began				
Not established	88.5%	55.7%	21.3%	86.9%
1 or 2 years old	4.9	18.0	26.2	6.6
3 to 5 years old	3.3	19.7	37.7	6.6
More than 5 years old	3.3	6.6	14.8	0.0

Note: Figures represent the percentage of schools that responded to our survey that have the characteristics in question. Note that in some cases schools have one or more of these activities, but have no seniors participating, suggesting that the activity was established only recently and has thus far been made available only to younger students. As explained in the previous chapter, all activities were asked about with reference to the 1995-96 school year. Percent of seniors who participated represents the percentage of those who were seniors in the 1995-96 school year who had participated at some time during their high school years.

The next set of rows in the table shows differences across schools in the maturity of these programs. In general, school-to-work activities are clearly in their early years,

reinforcing a finding from NWREL's process study of Washington's schools (Owens, 1995). With the exception of articulated agreements, most activities have been in existence for no more than a few years in all but a few schools.

Consistent with the goal of universality that Washington has established for its school-to-work systems, the extensiveness of student participation is one indicator by which the comprehensiveness of implementation can be judged. As a measure of extensiveness, we tabulated how many seniors had participated in at least one of the school-based learning activities sometime during their high school years. Figure III-1 shows that in almost two-thirds of the schools no more than 25 percent of the seniors had participated, including 23 percent of the schools in which none participated. Thus, in most schools in our study, school-based learning activities reach just a fraction of the exiting cohort that is a focus of our study. At the other extreme, in another 23 percent of the schools at least 75 percent of their seniors had participated, primarily representing schools where career majors were widespread.



Note: Figures represent the percentage of schools serving students in school-based activities in the percentages shown.

Beyond the extensiveness of student participation, another indicator of the completeness of implementation relates to the extent to which students are clustered with

others that share their career interests. The clustering of students with the same career major throughout all or most of their academic courses allows for academic teachers to integrate the teaching of their subject with vocational content drawn from the students' career interests. Moreover, clustering fosters social cohesion, which is felt to be an important component of the success of many school-to-work programs (e.g., Kemple, 1997). Table III—1 suggests that clustering is thus far uncommon, with only about 15 percent of schools with school-based learning activities regularly clustering for math, English, social studies, and the sciences. The use of applied academics, which fosters the integration of academic and vocational learning, is another bellwether indicator of quality. This too is not widespread, with only about one-third of the schools reporting that many or most students have taken at least one applied academics course. Finally, as another indicator of the lack of completeness of the integration of school-based academic and vocational learning, only rarely are students participating in project-based learning for which they receive a grade in both an academic and vocational course.

In general, then, when compared with an ideal model in which most students would be exposed to integrated academic and vocational learning focused around a career theme, these results suggest the incompleteness of the implementation experience thus far. On the one hand, almost all schools are conducting vocational assessment and career counseling for all or most of their students. Moreover, almost all schools have articulated programs in place and many have adopted a career-pathway model, which holds great promise in involving all students in context-rich instruction in a meaningful way. However, thus far relatively few students are participating in these or other school-based learning activities, and various indicators of the completeness of implementation suggest that much work remains to be done. In these respects, Washington seems little different from most other schools around the nation (Visher et al., 1998).

WORK-BASED ACTIVITIES

Work-based learning is another key component of the school-to-work experience promoted by the School-to-Work Opportunities Act. Of course, for a number of decades now, substantial majorities of high school youth have held jobs during the

**Table III-1:
Quality Indicators for
School-based Activities**

	<u>Percent</u>
Many or most students are clustered with others in the same program, for:	

Math classes	15.0%
English classes	15.0
Social Studies classes	12.8
Science classes	15.0
Students receive exposure to applied academics	
No students	8.2%
A few students	59.2
Many students	28.6
All or most students	4.1
Students earn a grade in both academic and vocational classes for a project	
No students	41.3%
A few students	45.7
Many students	10.9
All or most students	2.2

Note: Figures represent the percentage of schools with the characteristics in question. The sample is restricted to those schools that indicated they had at least one school-based learning activity; a few additional schools were dropped from the sample on any item due to missing data.

school year.¹⁵ But, in the school-to-work context, work-based opportunities are those arranged by the school and which are designed to reinforce classroom-based learning. Through actual or simulated work experience, it is believed, youth in school-to-work programs can hone their work maturity skills, gain familiarity with employers' expectations, develop vocational skills, and receive exposure to all facets of an industry. If the work assignment has a thoughtful training plan that is well implemented and integrated with the youths' classroom instruction, the experience also will bolster academic skills and enable youth to see the connection between work and learning.

As part of the school survey, therefore, we also asked each school to describe the work-based training opportunities they provided, with respect to their extensiveness, intensity, and quality. Specific activities asked about included cooperative education (in

¹⁵ See, for example, Greenberger and Steinberg (1986) *When Teenagers Work: The Psychological and Social Costs of Adolescent Employment* (New York: Basic), and D'Amico (1985) "Does Working During High School Impair Academic Progress?", *Sociology of Education* (57: 152-164).

which youth spend some time working at a job, typically as part of their vocational education program), other paid internships during the school year, unpaid internships during the school year, and paid or unpaid internships during the summer.

Nearly all schools (92 percent of our sample) provided worksite opportunities of one of these types to at least some students. Of these types, Table III—2 shows that cooperative education was by far the most common, in evidence in about 85 percent of the schools in our sample. This form of work-based training has been around since early in this century, and is widespread not only in Washington but in the nation as a whole.¹⁶ Next most common is unpaid school-year internships, in 41 percent of the schools, followed by summer internships (33 percent) and paid school-year internships (21 percent).

However, although almost all schools offer work-site training opportunities of some kind, relatively few students have access to them. Thus, in no school did more than one-quarter of the seniors participate in an internship at any time during their high-school years, and in only 16 percent of the schools did more than this number participate in cooperative education. These low penetration rates apply even though schools with these work-based opportunities typically began implementing them at least several years ago and in some instances much longer.

Figure III—2 reinforces the picture of quite low penetration rates by presenting the schools' rates of student participation in *any* of these activities. As the figure shows, only 11 percent of the schools indicated that none of their seniors had participated; thus, consistent with the previous discussion, almost all schools offer work-site training to at least some students. However, in only about 30 percent of the schools have more than 25 percent of the seniors participated, with only 8 percent of the schools providing

¹⁶ Recent tallies suggest that about half of all secondary schools offer cooperative education, and that about 8 percent of all juniors and seniors participate. See D. Stern, et al. (1995), *School to Work: Research on Programs in the United States*. London: Falmer Press.

Table III-2
Extensiveness and Intensity Measures for
Various Work Site Activities

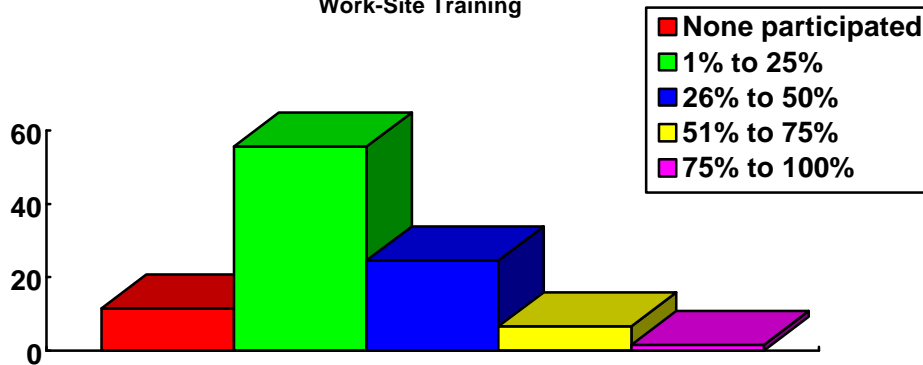
	<u>Cooperative Education</u>	<u>Paid School Internship</u>	<u>Unpaid Sch Internships</u>	<u>Summer Internships</u>
Percent of schools having this activity	85.2%	21.3%	41.0%	32.8%
Percent of seniors who participated				
None	14.8%	78.7%	59.0%	68.9%
1% to 25%	68.8	21.3	41.0	31.1
26% to 50%	11.5	0.0	0.0	0.0
50% to 75%	4.9	0.0	0.0	0.0
76% to 100%	0.0	0.0	0.0	0.0
Years elapsed since began				
Not established	14.8%	78.7%	59.0%	67.2%
1 or 2 years old	10.0	4.9	11.9	8.6
3 to 5 years old	26.8	14.8	22.2	19.0
More than 5 years old	48.4	1.6	6.8	5.2

Note: Figures represent the percentage of schools that responded to our survey that have the characteristics in question. Note that in some cases schools have one or more of these activities, but have no seniors participating, suggesting that the activity was established only recently and has thus far been made available only to younger students. As explained in the previous chapter, all activities were asked about with reference to the 1995-96 school year. Percent of seniors who participated represents the percentage of those who were seniors in the 1995-96 school year who had participated at some time during their high school years.

these opportunities to more than one-half of their seniors.¹⁷ These findings underscore the well-established difficulty that most schools have, not only in Washington State but across the country, in involving sufficient employers in school-to-work efforts to provide worksite opportunities to all or most students (Kazis and Goldberger, 1995; Bailey and Merritt, 1993).

¹⁷ As implied in the figure, 51 to 75 percent of the seniors participate in 6% of the schools, and more than 75 percent participate in an additional 2 percent of the schools.

Figure III-2
Extent to Which Seniors Have Participated in
Work-Site Training



Note: Numbers represent the percentage of schools that provided worksite training to various percentages of their seniors.

Given these difficulties, some schools have come to rely on job shadowing or school-based enterprises to give their students a taste of work responsibilities. Although neither of these activities entails private sector employment, both can be very valuable in providing exposure to the work world and in enabling young people to see the applicability of academic skills to careers. In job shadowing, youth spend at least several hours at a work site “shadowing” an employee, to gain an appreciation for what the job entails and the duties and skills that are required for successful performance. School-based enterprises represent simulated work experiences, as youth produce goods or services within the school for sale to others.

Table III—3 shows that both these components of work-based learning were fairly common—about 70 percent of the schools in our sample offered job shadows, and 65 percent offered school-based enterprises. But, as with most other work-based activities we have profiled, relatively few students participate. Thus, in most schools, job shadows either were not available (34 percent), or were provided to fewer than one-quarter of the students (44 percent); in only a few schools had all or most seniors participated at any time during their high school years. Similarly, school-based enterprises typically are small-scale activities, usually involving no more than a small proportion of the senior class.

As with school-based activities, we also identified certain bellwether indicators of quality for the work-site training that enables us to gauge how advanced these activities

Table III-3
Extent of the Use of Job Shadows and
School-based Enterprises

	<u>Job Shadowing</u>	<u>School-based Enterprises</u>
Percent of schools having this activity	70.5%	65.6%
Percent of seniors who ever participated		
None	34.4%	34.4%
1% to 25%	44.3	60.7
26% to 50%	13.1	4.9
50% to 75%	4.9	0.0
76% to 100%	3.3	0.0

Note: Figures represent the percentage of schools with the characteristics in question. Questions reflect the proportion of the 1995-96 cohort who had ever participated in these activities during their high school years. A school might have an activity and yet have no seniors who participated if the activity was recently introduced and thus has been made available only to younger cohorts.

are and, implicitly, how fully they incorporate the goals of well-developed school-to-work systems.¹⁸ These results are presented in Table III—4, with the sample restricted to those schools that have work-based learning of some type. One obvious indicator is the average duration of participation among students who participate. As the table shows, students who participate are given ample opportunity to learn a variety of skills in the work setting, if the duration of participation is any indication. Indeed, in almost all of the schools that provide these activities, students spend more than 10 weeks on the worksite and many spend more than 20 weeks.

Also facilitating their ability to learn is the presence of a written training plan, which is more likely to foster work experience that truly promotes vocational and academic learning, as opposed to merely providing exposure to the work world. Encouragingly, all or most students who participate in worksite training have a written training plan in about two-thirds of the schools, while schools that provide exposure to worksite training without such a plan for anyone are quite rare.

¹⁸ See Goldberber, Kazis, and O’Flanagan (1994) for a discussion of criteria for quality worksites.

Workplace mentors, who take a special interest in students as individuals and assist in their training, are also fairly common, and are typically a part of work-site training in about half of the schools. Again, this evidence suggests that, although

Table III-4
Quality Indicators for
Worksite Activities

	<u>Percent</u>
Average weeks worked by the typical student who participates	
1 to 10 weeks	8.9%
11 to 20 weeks	34.0
21 weeks or more	57.1
Students in work-site training have a written training plan	
No students	3.8%
A few students	13.2
Many students	18.9
All or most students	64.2
Students in work-site training have a workplace mentor	
No students	8.0%
A few students	32.0
Many students	12.0
All or most students	48.0
Students in work-site training earn certificate of occupational mastery	
No students	57.4%
A few students	38.3
Many students	4.3
All or most students	0.0

Note: The sample is restricted to those schools that indicated they had at least one work-based training activity, excluding solely job shadowing. Figures represent the percentage of schools with the characteristics in question.

relatively few students may participate in work-site training, those who do are potentially being exposed to a high-quality experience.

By contrast, the award of occupational skills certification is quite uncommon. In most schools, no one participating in worksite training is awarded such a certificate, and in only a few schools are more than a small proportion awarded one. Clearly, meaningful skills certification standards are difficult to achieve, and are likely to be found only where state agencies, along with secondary schools, employers, and industry groups, have worked hard over a period of years to develop and codify occupational competencies.

In summary, most schools have work-based learning in place and give evidence that the learning can be of reasonably high quality for those students who experience it. But, as with school-based learning, very few students are taking advantage of these opportunities in most schools.

PARTICIPATION BY TEACHERS

Internal support networks, including very importantly buy-in by teachers, are critical to building strong STW systems. Given that schools are traditionally organized according to subject disciplines, STW systems must educate teachers about what school-to-work entails, break down inter-disciplinary boundaries, overcome teachers' resistance and disciplinary prejudices, and facilitate teachers from diverse fields working together to develop or revise courses to integrate academic and vocational teaching. Moreover, their ability to do so often critically hinges on schools' providing teachers with adequate resources, including the opportunity for professional development and common preparation time for collaborative planning.¹⁹

The results reported by the schools in our sample on the degree of teacher involvement are shown in Table III—1 and seem quite consistent with the picture of a mixed state of STW implementation that has emerged from the earlier tables in this chapter. On the one hand, in almost all schools at least some teachers are involved in planning and implementation, and, encouragingly, joint academic/vocational teaching teams are very widespread. On the other hand, for all activities except joint teaching at best only some teachers are involved in the large majority of schools in our sample. Clearly efforts towards school-to-work implementation are well underway, but these have not yet crossed the threshold towards being the systemic efforts that are the ultimate objective.

¹⁹ For a discussion of the importance of and impediments to teacher collaboration, see Little (1995).

Table III-1
Teacher Involvement in STW System Building

	No Teachers	Some Teachers	Many/All Teachers
Planning, implementation, and operation of stw efforts	3.3%	60.7	36.0%
Revising courses to cover pathways related to a career	26.2	50.8	27.0
Professional development/in-service training in stw	8.2	55.7	36.1
Worksite internships or shadows	24.6	65.6	9.8
Joint academic/vocational teaching teams	1.6	26.2	72.1
Regular interdisciplinary collaborative planning re stw	33.3	58.3	8.3
Working with other teachers to develop joint curricula to emphasize a career area.	38.3	55.0	6.7

Note: Numbers represent the percentage of schools who reported that no, some, or many/all of their school's teachers participated in the activities shown in the column headings.

INDICES OF SCHOOL-BASED AND WORK-BASED ACTIVITIES

The preceding sections have told us a good deal about the state of school-to-work implementation in Washington during the 1995-96 school year. However, consistent with the analysis plan presented in Chapter II, linking these pieces together to build a classification of schools is critical to the overall analysis effort. For this classification, we must know not only how schools are distributed separately along each dimension of implementation, but jointly how these dimensions relate to each other.

As discussed in the preceding sections, the strength of a school's school-based and work-based systems can be viewed as a function of: the extent of participation, as reflected in the proportion of the school's senior cohort who were reached by these activities; the intensity of participation, as reflected in the average duration of their exposure; and the quality of their experience, as reflected by certain bellwether indicators. To understand how these elements cohere and as a way of developing summary indices of school-to-work system building, we use principal components analysis, a technique designed for reducing data by examining the interrelationships among related indicators of underlying components. The factor scores from the first principal component of the

unrotated factor solution will be used to measure each school's place along a continuum of, first, school-based and, next, work-based implementation. (A brief explanation of principal components analysis is presented in Appendix E.)

An Index of School-Based Implementation

Although the previous section focused on *which* activities the school offered (e.g., career academies, pathways, etc.), for purposes of developing a summary classification we care little about the *types* of activities, because we view the various alternatives as potentially interchangeable. Instead, in keeping with the conceptual model presented in Chapter I, the focus here is on what proportion of the students in each school are reached by any of these activities and the intensity and quality of the average student's experience.

Using this line of thinking, we developed a priori the following measures:

- Percent of the senior class that participated in any of school-based learning activity.²⁰ Given Washington's stated objective that school-based activities are for *all* students, more well developed systems would involve greater proportions of the exiting cohort.
- Percent of the senior class that participated before the senior year. This variable represents a measure of the length of the exposure to school-based activities.
- Number of options. In general, schools offering a greater number of options would be of higher quality, in that they would be better able to match a student's career interests to a school-based learning experience. Operationally, this variable represents the sum of the number of options in career academies, career pathways, articulated programs, and apprenticeships that are available.
- Average program maturity. This variable represents the average number of years the various school-based activities have been in operation.²¹ Other things being equal, we assume that more mature programs are more highly developed.

²⁰ Specifically, this variable is calculated as the response to questionnaire item 19, divided by the senior class size (the latter was supplied by the Office of the Superintendent of Public Instruction). Although, according to the School-to-Work Opportunities Act, career assessments are also classified as school-based activities, we exclude such activities from the index of implementation here, for two reasons. First, career assessment and counseling *by themselves* are not likely to appreciably impact students' achievements, but should instead be viewed as a prelude to school-based *learning* activities. Second, most schools provide career assessment and counseling to all or most students (see results on this earlier in this chapter), so such activities would not be useful in discriminating between schools.

²¹ We calculate this variable as the average years elapsed since inception (capped at 8 years) for each of the various options, weighted by the proportion of the senior class that participated.

- Use of applied academics. This variable is calculated as the percentage of the senior class who were exposed to an applied academics curriculum.²² Applied academics entails the teaching of academic subjects in an applied context; as such, it represents the integration of academic and vocational skills instruction, one of the hallmarks of well-developed school-to-work systems.
- Cluster students by career major. This variable is calculated as the average percentage of the senior class who are grouped with others with the same career interest for math, English, social studies, and science classes.²³ As mentioned earlier in this chapter, some research has suggested that the effectiveness of school-based activities can be enhanced to the extent that students with the same career interests are grouped together for some or all of their academic courses.
- Dual grades for projects. This variable represents the percentage of the senior class that was engaged in a project for which they received a grade in both an academic and vocational class. It is taken to be an indicator of program quality, in that it represents both the use of project-based learning and the integration of academic and vocational skills.²⁴
- Teacher involvement. This variable represents the percentage of the school's teachers who are revising courses to cover career themes, or are involved in joint academic/vocational team teaching, or the joint development of curricula to emphasize career areas.²⁵ This measure reflects the fact that the integration academic and vocational curricula in school-based learning can only occur with strong teacher involvement in planning, teaching, and course development.

²² The questionnaire item asks whether no students, a few students, many students, or all or most students were exposed to applied academics, from among those participating in school-based activities. The four points along this ordinal scale were converted to the following percentages: 0, 25 percent, 50 percent, 75 percent, respectively. These percentages were then multiplied by the proportion of the senior class participating in a school-based activity. Thus, potential end points on this variable are 0 and 75 percent.

²³ The survey item asked respondents to circle the proportion of students participating on a four-point scale, for each of these four subject areas. As with the coding for applied academics, we converted these to percentages (at 25 percentage point increments from 0 to 75 percent), averaged across the subjects, and multiplied the average by the proportion of the senior class participating in school-based activities.

²⁴ This variable was computed identically as applied academics; specifically, the 4-point ordinal scale was transformed by subtracting 1 from each scale value and multiplying by 25, to yield approximate percentages (with values of 0, 25, 50, and 75). The result was multiplied by the proportion of seniors participating in school-based activities of any sort.

²⁵ This item is based on questionnaire items 40b, e, and g. Each ordinal scale was converted to percentage, ranging from 0 to 75 percent. These values were then averaged across the 3 survey items.

Basic descriptive statistics on these items, including means, standard deviations, minimums, and maximums, are shown in Appendix E and suggest a broad range of implementation in the schools in our sample, with some not yet having begun school-based activities for their seniors and others serving nearly everyone. However, in the average school fewer than a third of the senior class participated, very few students participated for more than one year, most programs are only about one-year old, and very few students receive applied academics, are clustered with other students in their career major for core academic courses, or participate in project-based learning for academic and vocational credit. In the average school, only about one-fifth of the teachers are involved in redesigning courses or in joint teaching to take career themes into account.

Principal components analysis was used to examine whether these separate indices “hang together” and whether a single underlying dimension of school-based implementation underlies them. To the extent that they do relate closely, this technique provides a way of developing an optimal set of weights that can be used in combining the separate indices in developing a summary index.²⁶ The results of the unrotated solution are shown in Table III—1. As the table shows, the first factor has an eigenvalue of 5.4, more than 6 times the eigenvalue of the next most important factor. This factor alone accounts for almost 70 percent of the total variance represented by these variables; by comparison, all subsequent factors are much less important. Finally, each of the 8 separate measures of school-based activities contributes roughly equally to the determination of the first factor, with all their eigenvectors falling within a relatively narrow range. Thus, based on these results, we will interpret the factor scores generated from the first factor as representing an index of school-based implementation.

Table III-1
A Principal Components Analysis of
Measures of School-Based Implementation

	Factor 1	Factor 2	Factor 3	Factor 4
Pct schbase	0.41	-0.16	0.11	-0.16
Pct pre-sr yr	0.36	-0.40	0.06	0.25
No. of options	0.35	-0.06	0.46	-0.26
Avg. maturity	0.38	-0.39	0.13	0.23

²⁶ The logic underlying principal components analysis is described in more detail in Appendix E.

Applied acad	0.37	-0.02	-0.42	-0.10
Cluster by careers	0.32	0.47	0.14	-0.60
Grade for projects	0.34	0.17	-0.70	0.06
Teacher involve	0.28	0.64	0.27	0.65
Eigenvalue	5.40	0.84	0.55	0.45
Pct of variance	67.5	10.5	6.8	5.7

Note: Numbers in the rows defined by the variable headings are eigenvectors for the first four factors from an unrotated principal components analysis. See Appendix E for a brief explanation of principal components analysis.

An Index of Work-Based Implementation

As with the school-based implementation index, we derive a number of summary measures of the extensiveness, intensity, and quality of the schools' work-based activities:

- Percent of the senior class that participated in either internships, cooperative education, or school-based enterprises.²⁷ Again, given the objective of universality, schools that have a higher proportion of students participating are thus viewed as exhibiting the hallmarks of a more highly developed system.
- Average number of weeks a typical senior would have participated in any of the above activities. Average weeks is taken to be a measure of the intensity of the intervention; the work-based learning experience is likely to have a more important impact when students participate for a longer period of time.²⁸
- Average program maturity. This variable represents the average number of years each work-based activity (including school-based enterprises, but

²⁷ This summary measure is calculated as the sum of questionnaire items 25 and 32b (col. C), divided by the senior class size. There is the potential for some double-counting with the measure computed this way, to the extent that a student participates in any of the work-based activities captured by question 25 and also a school-based enterprise.

²⁸ The number of weeks a typical participant participated in each of cooperative education, paid internships during the school year, unpaid internships during the school year, paid or unpaid internships during the summer, and school-based enterprises was multiplied by the proportion of seniors who participated. The product was divided by the sum of participants and multiplied by the number of seniors who participated in at least one of these activities.

excluding job shadows) has been in operation.²⁹ Other things being equal, we assume that more mature programs are more highly developed.

- Percent with a training plan for work-based activities. This variable is calculated as the approximate percentage of the senior class with a written training plan for their work-based activities.³⁰ The use of a formal training plan is likely to improve the quality of the work-based experience and suggests that it imparts real skills, and is not used just to provide work experience or demonstrate skills that have already been learned elsewhere.
- Percent in work-based activities with a workplace mentor. This variable is calculated as the approximate percentage of the senior class with a workplace mentor.³¹ Mentoring is thought to be an important component of effective work-based learning, because it gives students the opportunity to receive guidance and individual attention from a caring adult.
- Percent in work-based activities that earned an occupational skills certificate. This variable is calculated as the approximate percentage of the senior class that earned a certificate recognized by employers that indicated mastery of a specific occupational skill.³²
- Percent in job shadows. This variable is created as the number of seniors who have participated in a job shadow, as a proportion of the senior class size. Although no substitute for spending time on a job site performing actual job tasks, job shadows can be used to show students the relevance of the skills they are learning in the classroom and to demonstrate what it takes to be successful in the workplace.

Basic descriptive statistics on these items—including means, standard deviations, minimums, and maximums—are shown in Appendix E and reaffirm our earlier conclusion that relatively few students are participating at most schools. For example, only about one-quarter of students are participating in work-based learning of any sort, and few

²⁹ This variable is calculated as the average years elapsed since inception (capped at 8 years) for each activity, weighted by the proportion of the senior class that participated in it.

³⁰ The questionnaire item (#26) asks whether no students, a few students, many students, or all or most students from among those participating had a written training plan. As with similar measures of the quality of school-based learning, we converted these values to approximate percentages: 0, 25%, 50%, 75%, respectively. These percentages were then multiplied by the proportion of the senior class participating in any work-based activity.

³¹ As with written training plans, the 4-point scale of the relevant questionnaire item (#27) is converted to approximate percentages, with values of 0, 25%, 50%, 75%. These percentages were then multiplied by the proportion of the senior class participating in any work-based activity.

³² The 4-point scale of the relevant questionnaire item (#30) was converted to approximate percentages, and multiplied by the proportion of the senior class participating in any work-based activity.

students have a written training plan or a workplace mentor. Job shadows, too, are fairly uncommon, with just 15 percent of students participating, on average.

Following a procedure already described, principal components analysis was used to examine whether a single underlying dimension can adequately describe these data. These results are shown in Table III—1 and suggest that indeed it does. As the table shows, the first factor captures three-quarters of the total variation and is over 6 times as important as the next most important factor (which seems to represent the prevalence of job shadowing over other work-based activities). Based on these results, we take the factor scores generated from the first principal component as representing each school's place along a continuum of work-based implementation.

The Relationship Between School-based and Work-based Components

From the above analyses, each school has been arrayed separately on dimensions of school-based and work-based implementation. But how closely related are these two dimensions empirically? Do schools tend to move incrementally along each dimension simultaneously, as they build up their school-to-work systems? Or do they proceed in fits and starts, perhaps concentrating on school-based elements at first, before moving on to work-based components, or vice versa?

Table III-1
A Principal Components Analysis of
Measures of Work-Based Implementation

	Factor 1	Factor 2	Factor 3	Factor 4
Pct wrkbase	0.42	-0.03	-0.16	-0.24
Avg wks participate	0.39	-0.06	0.40	-0.68
Avg maturity	0.41	-0.12	0.05	-0.05
Pct w/ trng plan	0.42	-0.10	-0.31	0.11
Pct with a mentor	0.39	-0.02	-0.57	0.23
Pct earn certificate	0.36	-0.20	0.61	0.64
Pct in job shadows	0.21	0.96	0.11	0.10

Eigenvalue	5.14	0.81	0.47	0.29
Pct of variance	73.5	11.6	6.7	4.1

Note: Numbers for the rows represented by the measures of implementation are eigenvectors for the first four factors from an unrotated principal components analysis. See Appendix E for a brief explanation of principal components analysis.

The scatterplot shown in Figure III-3 addresses these questions. The two dimensions to this plot are the principal component scores generated from the first component of school-based implementation, shown on the horizontal axis, and from the first component of work-based implementation, shown on the vertical axis. The plot clearly suggests that school-to-work implementation is not proceeding linearly on both dimensions simultaneously. Instead, schools are smoothly arrayed on each dimension taken singly, but many of them appear quite unbalanced when the two dimensions are looked at jointly. To see this, imagine a line running through the origin at a 45° angle, from the bottom-left quadrant to the top-right quadrant. This line represents (approximate) points of balanced implementation along both school-based and work-based components.³³ Clearly, not many schools are close to this imaginary line, although some are. In fact, the correlation between these two dimensions is a very modest .118, suggesting only a weak positive relationship.

³³ The 45° line only approximately represents points of balanced implementation, because the two scales are normed somewhat differently.

Implicit in the plot in Figure III-3, we might think of the following categories of schools: low implementation schools, balanced implementation schools, and two types of unbalanced implementation schools.

Low Implementation Schools. These schools are located in the bottom-left quadrant of the plot, and are characterized as having not yet implemented either school-based or work-based components to any appreciable degree. For example:

One school, located east of the Cascades in an urban setting, formally began school-to-work activities with the 1995-96 school year. During this school year, it had not yet put in place any school-based activity, including either career academies or pathways, and it had no articulated agreements in place. Similarly, it was not yet offering any paid or unpaid internships and provided no opportunities for job shadowing. It did, however, have a small number of seniors participating in cooperative education, as part of a long-standing arrangement with employers in the community, and had begun planning for the introduction of additional school-to-work components in the future.

Another school, this one located in a rural community in western Washington, has embraced school-to-work in earnest. Distressed at students' apparent lack of motivation for schooling, school officials substantially revamped curricula beginning in the 1994 school year to help students "see relevance in learning and to assist (them) in creating a vision for their future." Accordingly, it implemented a career pathways model in 1995-96 and targeted junior high school students for implementation, focusing on the graduating class of 2000. All students in this cohort have completed interest inventories and have begun career exploration, as a prelude to their choosing a career pathway as a focus to their studies as they enter the 9th grade. These efforts, however, have come too late for the seniors of 1995-96, who are the focus of our study.

Balanced Implementation Schools. Another group of schools in our sample are close to the imaginary 45° line and have made at least some progress towards implementing both school-based and work-based components. Some of these schools are still at modest levels of implementation, but their school-based and work-based components are fairly evenly matched. As an example:

This rural school is also relatively new to school-to-work and has a vision of providing well developed school-based and work-based components to all students for new entering cohorts. This school's initiative was launched when school officials became concerned about the lack of work preparedness of its recent graduates, as evidenced by feedback the school had received from its graduates' survey. It also learned from a school climate survey that students felt that staff were not closely involved in their educational development. During the 1994-95 school year, it took concerted action with a 'visions, ventures, voyages' initiative, designed to reach students in grades 2 through 12. Although many of its efforts are still new and thus haven't yet reached many 12th graders, it nonetheless introduced in early 1996 a career

pathway design, in which about one-third of its seniors are participating. Meanwhile, its workplace mentorship program, introduced in 1994, along with a small school-based enterprise, are together reaching about one-half of its seniors. Although this school's efforts should be substantially better developed in a few years' time, it nonetheless has the foundations of a well-balanced system in place and is already reaching an appreciable number of its seniors.

Meanwhile, a very few other schools in our sample are categorized as having balanced designs that are even further along. Having gotten a head start on developing a school-to-work system, these schools already have fairly well implemented school-based and work-based components in place. For example:

This school, located in the west of the state, has also embraced school-to-work in a big way. Although its efforts are relatively new and are still maturing, it has key elements of both school-based and work-based components in place. Its career pathways, in which all students are expected to participate, were established in 1995, and include arts and entertainment, business and marketing, engineering and science, health and human services, and industrial technology. Each senior in the 1995-96 cohort participated in one of these, but, because of the recency of their effort, none did so before their senior year. Its work-based components are somewhat older and, hence, are even more fully developed. Its cooperative education program, for example, was established in 1980 and served two-thirds of the senior class. All or most participants had a written training plan to guide their work-based activities and were assigned a workplace mentor to provide guidance and encouragement. The school also makes extensive use of job shadows and has a well-developed school-based enterprise.

This school, in one of the state's major metropolitan areas, began school-to-work implementation in earnest during the 1991-92 school year. It is part of a consortium that includes in the partnership: school districts, community colleges, labor, the PIC, and government agencies. This consortium has adopted career paths as a comprehensive model around which curriculum is focused, and many of the school's teachers are involved in planning and implementation, revising courses to incorporate career themes, and working jointly in teams drawn from both academic and vocational departments. Some of its career pathways were established as early as 1992, others more recently, but nearly all members of the senior class have participated for at least a year or two. Applied academics is used extensively, and many students are expected to engage in a project, for which they receive a grade in both an academic and vocational class. In addition to these school-based activities, many seniors also participate in cooperative education arrangements with local employers, lasting for most of the school year, and others participate in unpaid internships lasting at least 3 weeks. Finally, a small number of seniors benefit from articulated agreements that the school has established with four separate post-secondary institutions in the area.

Unbalanced Implementation. As the scatterplot suggests, an appreciable number of schools are located in the upper-left and lower-right quadrants, representing schools

that have strong work-based components in place but have made little progress on school-based implementation, or vice versa. Unbalanced systems may reflect the difficulty many schools have in developing school-based and work-based components simultaneously. Alternatively, in some cases, the lack of balance may reflect deliberate design choices that schools are making. In any case, the fact that so many schools are in these off-diagonal quadrants suggests that it is mistaken to imagine that schools proceed smoothly in gradually developing all elements of their school-to-work systems at the same pace. Instead, some schools are able to make substantial progress on some dimensions of implementation but little progress at all on others.

For example, in some schools—those in the upper-left quadrant of the scatterplot—work-based implementation has proceeded to at least some degree, but school-based elements have lagged behind. Most of these schools are fairly close to the horizontal axis, suggesting that even work-based elements are not very well developed, but at least two schools are the exceptions. Both are near the upper range on the vertical axis, representing the work-based dimension. As an example of one of these:

This school began school-to-work implementation fairly recently but was able to build on strong work-based components that have been in place for some time. For example, for more than a decade it has been providing most of its students with 9 weeks of work opportunity through its cooperative education program. Additionally, it has recently supplemented that with paid or unpaid internships during the school year that serve most of the remaining students, and it has a school-based enterprise (a student store) that serves additional students. Job shadows have also recently been introduced. Participants generally have a written training plan for their work-based activities and are assigned a workplace mentor. By contrast, the school has few concrete school-based components in place. It has established neither career academies nor career pathways, although it has formed articulated agreements with several postsecondary institutions, in which a few students participate. This school views its school-to-work efforts as primarily targeted to students at risk of dropping out, those with limited English proficiency, or those with disabilities.

In other schools, those in the lower-right quadrant, the uneven development has favored school-based components. In this quadrant, schools are spread out fairly evenly along the horizontal axis, suggesting varying stages in the implementation of school-based components, but they are all below the horizontal axis, suggesting that few work-based components are in place. For example:

One school at the high end of school-based implementation is located in a rural area and has a high concentration of minority and economically disadvantaged students and historically has had a high dropout rate. It has embraced the school-to-work initiative as a way of helping students see the relevance of their course work and

getting them better motivated to succeed. The program starts in the summer prior to the 9th grade, when students and their parents receive a 3-day orientation session. Students also participate early on in a career interest inventory, and, thereafter, they select a preliminary career pathway from one of five choices: arts and communication, business and marketing, engineering and science, health and human services, and industrial technology. In the 9th through 12th grades, students conduct career research on occupations within their pathway, and they take courses and engage in projects that integrate academic and vocational curriculum. In the senior year, students additionally make an oral presentation, where they present their portfolio to the community. In the summer before their senior year, students are encouraged to conduct an internship with an employer in the community, for which they receive academic credit, but this is not mandatory; job shadows are also generally available. Nearly all seniors had participated in the school-based activities, but not many had participated in the work-based activities by the time of our study, perhaps because the internships and job shadows were still relatively new. This school clearly has the potential for establishing a very effective school-to-work experience for its more recent cohorts, but the senior class of 1995-96 hadn't fully participated.

Absolute vs. Relative Scales of Implementation

According to the methodology of principal components analysis, schools have been assigned a score along the dimensions of school-based and work-based implementation that denotes where they fall in comparison to other schools in the sample. In other words, schools are arrayed *relative* to other schools, and not on an absolute scale; consistent with this, the zero point on each scale represents the score for the average school in the sample. Thus, schools with the highest scores are not necessarily well-developed systems in any absolute sense, but only in comparison with the rest of the schools we have surveyed.

As an aid in interpreting the scale, we can generate principal component scores, using this same scoring algorithm, for hypothetical schools that would represent lowest and highest possible values of implementation on each of the components of school-based and work-based strategies that make up the index. In so doing, we can gauge how much progress the schools in our sample have made thus far and how much more they would need to make before they could be classified as “fully developed” systems, according to the scoring algorithm.

Table III-1 presents these comparisons, showing the lowest and highest index values for the schools in our sample, and the hypothetical minimum and maximum values, on both the school-based and work-based scales. Note that the lowest values shown in the table correspond to both the lowest values in the sample and the hypothetical lowest values, and are represented by schools that have not yet begun school-to-work implementation, at least the way it has been measured here; in other words, the actual

lowest values are represented by schools in our sample that have no students participating in the work-based or school-based components that make up our index. The highest values, by contrast, are about 55 to 60 percent of the hypothetical maximum values. These hypothetical maximums would be realized by schools serving all their students with the component in question and providing each of them a high quality experience as measured by our bellwether indicators.³⁴ This evidence suggests, then, that even the schools in our sample with the best developed systems still have a way to go before the goals of universality, intensity, and high quality are fully realized. Similarly, because the distribution of actual scores is very asymmetric around zero, the schools in the sample are revealed to be heavily clustered around low levels of implementation, with just a few schools tapering off towards the higher end of the scale.³⁵ The scatterplot makes this point as well.

Table III-1
Lowest, Highest, and Maximum Possible
Scores on Scales of Implementation

	Actual Schools in Sample		Hypothetical	
	Lowest	Highest	Minimum	Maximum
School-based index	-2.24	5.98	-2.24	10.91
Work-based index	-2.65	7.97	-2.65	13.38

³⁴ In computing the hypothetical maximum for the school-based index we assume that a fully developed system would serve 100% of its students in a school-based component, that all students would start participation before the senior year and would receive applied academics, be clustered with others in their career track for core academic courses, and engage in project-based learning for which academic and vocational grades were awarded. We also assume the school has at least 10 different options from which to choose (e.g., the combination of career paths, articulated agreements, etc.) and that the school's program is at least 8 years old. In computing the hypothetical maximum for the work-based index we assume that a fully developed system would serve 100 percent of its students in a work-based component, that all students would participate for at least 36 weeks, and would have a written training plan and a workplace mentor and would earn an occupational skills certificate. We further assume that the work-based program is at least 8 years, and, finally, that all students participate in job shadows. The hypothetical minimum values would be represented by schools that had no students participating in any component.

³⁵ Zero represents the score for the average school in the sample. Because the school with the lowest score is closer to zero than is the school with the highest score, the distribution of schools is sharply skewed, with many more schools clustered near the low end than the high end.

IV. FACILITATORS AND IMPEDIMENTS TO IMPLEMENTATION

One fact that the early results from the National STW Evaluation make clear is that successful school-to-work implementation takes time. Systemic change of the sort being envisioned cannot be expected to happen overnight. Of course, some elements of school-to-work have been in place in many of Washington's schools for quite some time (e.g., school-based enterprises, cooperative education, career counseling), but conceptualizing school-to-work as a *system* has been a relatively recent development and will take time to achieve fruition. Early results from the National Evaluation in fact suggest that Washington's experience is not uncommon—across the nation, many STW consortia are doing many different things relating to school-to-work, but very typically only subsets of students participate in activities beyond career exploration and counseling, worksite opportunities are sparse, and curricular integration has been slow to develop (Medrich, Giambattista, and Moskowitz, 1997; Visher et al., 1998).

Moreover, time alone will not transform systems. Local consortia must share a vision of what is possible and make concerted and persistent efforts over a period of years to see that vision through to reality. They can do so only with adequate resources, including staff time and financial contributions, and the support of school administrators.³⁶ In this chapter we explore some of the concomitants of and barriers to system development.

PARTNERSHIPS IN WASHINGTON'S SCHOOL-TO-WORK INITIATIVES

As discussed in Chapter I, an important determinant of the coherence and quality of school-to-work systems is the strength of the partnerships that are in place. Strong partnerships are essential to the success of school-to-work efforts, because the wholesale systemic reform envisioned by the School-to-Work Opportunities Act can only come about if all key stakeholders in the training of young people gauge what needs to happen and work together to achieve reform.

The support of the business community can be especially important. Without business support, students have little chance of enjoying work-based learning

³⁶ See, for example, Ramsey, Eden, Stasz, and Bodilly (1995), "Integrating vocational and academic education: lessons from the early innovators." In Grubb (ed.) *Education through Occupations in American High Schools, Vol. 2: The Challenge of Implementing Curriculum Integration*. New York: Teachers College.

opportunities, including paid and unpaid internships, cooperative education, youth apprenticeships, and job shadows. The business community also can exert strong leadership, in developing new curriculum, contributing financial or other resources, and exercising governance or oversight functions. Finally, businesses can provide much needed legitimacy to school-to-work efforts; if businesses lend tangible and visible support, young people and their parents can feel that participation in a school-to-work program can enhance subsequent career opportunities.

Postsecondary institutions have also been mentioned as crucial partners for successful school-to-work initiatives, and for some of the same reasons. Without the strong support of vocational and two-year colleges, and even four-year colleges, school-to-work can be viewed as merely a variant of vocational education, and thus career limiting rather than career enhancing. Downward articulation, with the elementary and middle school grades, is also instrumental in forging a coherent system of school-based learning that provides young people with a set of integrated experiences that build on each other.

Finally, other partners, including governments and community organizations, can assist in governance and planning, contribute needed financial or other resources, engage in promotion and marketing, or provide worksite opportunities for students.

Table IV-1 shows that a wide diversity of partners has gotten involved in school-to-work initiatives throughout the state. Employers and business organizations, the local school districts, two-year postsecondary institutions, local governments, and service and community-based organizations have all been identified by over 75 percent of the schools as at least somewhat important to the success of the schools' efforts. Clearly, a lot of different actors have become involved in school-to-work efforts, a fact that bodes well for the future development of this initiative. On the other hand, four-year colleges, a potentially important partner in ensuring access to educational opportunities, are less often participants in the STW partnerships covered by our study, consistent with findings for the nation as a whole.³⁷ However, given that Washington

³⁷ Progress Measures from the national study of STW implementation show that 69% of local partnerships throughout the nation involve the participation of at least 1 four-year college, as opposed to 97 percent that involve the participation of two-year colleges. These findings say nothing about the strength of partnerships, however. See Medrich, Giambattista, and Moskovitz (1997).

Table IV-1
Percent of Schools Rating Various Partners
as Somewhat or Very Important

	Percent of Schools
Business and Labor Org.	
Private sector firms	95.1%
Business or trade associations	88.5
Labor unions	59.0
Education and Training Institutions	
Local school district	91.8
Other K-12 schools	74.6
Two-year postsecondary	83.6
Four-year postsecondary	41.6
Alternative education	62.3
Private training institutions	30.2
JTPA/PICs	59.0
Government and Community Organizations	
Local/regional government	77.9
Service organizations	81.7
Community-based orgs.	75.0
Indian tribes or organizations	30.0
Advocacy groups	24.6
Parent/student associations	62.7

Note: Figures represent the percentage of schools who ranked each of these partners as somewhat or very important in their efforts.

State has only six public 4-year colleges, their relatively low level of involvement may very well reflect a lack of proximity to most STW consortia.

We also asked our respondents to note the areas in which selected partners had been important, from establishing curriculum to providing internships, from serving in a

governing capacity to participating in career days or job fairs. These results, reported in detail in the *Report on the School Survey*, show the extraordinary array of areas in which business partners have been of assistance. For example, more than 60 percent of schools report that business has been of at least some assistance in providing paid internships, opportunities for volunteer work, and student job shadows; in supporting school-based enterprises and cooperative education; in offering teacher worksite opportunities and student mentoring; in developing skill standards; in providing financial contributions; in serving on advisory boards; in promoting and marketing the STW initiative; and in attending career fairs, hosting student field trips, and serving as guest speakers. Clearly, the business community has bought into the STW initiative in many consortia and is serving as a key member of the partnership. Its support spans a gamut of areas essential to the strength and sustainability of the initiative.

By contrast, other partners are supportive in a narrower set of areas. Post-secondary institutions, for example, almost everywhere lend their support to forging dual enrollments and articulated agreements, and to a lesser extent in attending career fairs or serving as guest speakers, but are not consistently active in other areas. Local governments and community-based organizations (CBOs) are even less active participants in most partnerships, as are labor and union groups. Of course, these data do not suggest whether the involvement of these groups is limited because of their unwillingness to participate, or because STW coordinators have not actively sought their support, or because lack of physical proximity makes their involvement difficult or infeasible. For example, labor unions are not prominent in many parts of the state, and their limited involvement may be explained in this way.

BARRIERS TO IMPLEMENTATION

Studies of school-to-work systems elsewhere in the country have identified a number of serious impediments to full implementation, including a lack of support from teachers and administrators, negative labeling of the school-to-work initiative in the eyes of parents, and a severe lack of resources and time for planning. We asked the schools in our sample how their progress towards implementation was affected by these factors.

Of them, the school-to-work coordinators who filled out our survey overwhelmingly identified lack of resources—staff, time, and money—as the most important factor. As shown in Table IV—1, fully 60 percent identified this factor as a serious barrier, and another 37 percent cited it as at least somewhat important; only 3 percent felt a lack of resources was not important. Elsewhere, resistance by school faculty or staff was also

perceived as important, with over 80 percent of the schools identifying it as at least somewhat important. This finding reflects the difficulty many schools nationwide are having in whittling away at internal resistance and converting schools, with their typical organization around “departments,” into more fluid arrangements that can facilitate cross-disciplinary team teaching and curriculum planning.

Table IV-1
Perceived Barriers to STW Implementation

	Not a Barrier	Somewhat of a Barrier	A Serious Barrier
Resistance of school faculty or staff	18.3	61.7	20.0
Lack of support among school administrators	60.7	27.9	11.5
Negative attitudes among parents or students	51.7	41.4	6.9
Lack of support of postsecondary institutions	50.8	39.0	10.2
Lack of support of local employers	71.7	26.7	1.7
Lack of support from unions/labor	52.6	43.9	3.5
Lack of business in the community	53.3	36.7	10.0
Difficulty including special students in school-to-work	76.3	23.7	0.0
Lack of staff, time, and money	3.3	36.7	60.0

The table is also interesting for what seem not to be substantial impediments. For example, the unfavorable misimpression that parents across the country often have of school-to-work as “not for my child” appears not to be a serious barrier among the schools in our sample. Thus, the school-to-work initiative in the State of Washington has apparently been successful in marketing its efforts and ensuring that parents and students are fully informed. Reflecting the strength of the local partnerships, as a previous section indicated, a lack of involvement of business, labor, and postsecondary institutions also is not viewed as a serious barrier in very many places. Including special students in school-to-work systems is also not mentioned as a factor. Finally, school administrators seem to be behind the school-to-work initiative, as only 12 percent of the schools cite their lack of support as a serious barrier.

FACTORS ASSOCIATED WITH IMPLEMENTATION

As suggested by the conceptual model presented in Chapter I, differences in resources and levels of commitment and the strength of partnerships are some of the reasons why school-to-work implementation could be expected to have proceeded unevenly throughout the state. As the model also suggests, some schools develop a stronger impetus for school reform, given what they perceive as problems with lagging student achievement or to overcome their previous disadvantages.

As a way of examining these hypotheses, we have categorized schools into those with low and high scores on each of the school-based and work-based implementation scales and examined how these groups differ with respect to an array of school characteristics, including³⁸:

1. Spatial/geographic factors, including the percentage of schools in each group that are located in metropolitan areas and that are West of the Cascade Mountains. We have no strong hypotheses here, but differences between groups in these characteristics can provide evidence of whether STW is being pursued with equal vigor in all parts of the state and whether work-based learning is less viable in rural areas, where employers may be harder to recruit.
2. Average student body characteristics, including the average percentage of students who are members of racial/ethnic minority groups and, as a measure of socioeconomic status, the percentage of students who are eligible for free or reduced-price lunch. In general, experiences elsewhere in the country suggest that lower SES schools are often more willing to embrace STW. To the extent that minority composition is correlated with SES, students with a higher minority composition might also be disproportionately those at higher levels of implementation.
3. The average pupil/teacher ratio, as a measure of the general resources the schools have available. Other things being equal, more pupils per teacher might be evidence of a lack of school resources that might make STW implementation difficult.
4. Average test scores, measured for 11th graders in 1993 and 1994, as a measure of mean student achievements. School administrators work hard but often with limited success to overcome the stigma that STW is for the non-college bound. To the extent that this is true, high implementation schools will generally have lower scores.

³⁸ Schools with component scores of less than zero were classified as Low implementation schools, while those with scores greater than zero were classified as High implementation schools. Recall from the previous discussion, however, that schools with scores above zero can generally be considered high implementation only in a relative but not in an absolute sense.

5. Strength of partnerships with postsecondary institutions and businesses. Two separate indices have been created representing the strength of partnerships with business and postsecondary institutions.³⁹ Strong business partnerships can be especially critical for the development of work-based opportunities. Similarly, strong postsecondary partners can assist with curriculum reform and promote access to higher education for graduates.
6. Time since implementation formally began. Systemic change takes time, we anticipate that schools that have begun their formal efforts earlier would be further advanced, other things being equal.⁴⁰
7. Resources for implementation. Two factors are considered here, including whether the school district received STW funds during the 1993-95 round of funding, and the respondents' appraisal of whether the "lack of staff, time, and money dedicated to STW" has been a barrier to implementation.⁴¹ Given the importance of adequate resources for implementation, we expect that schools with more resources for implementation would be further advanced, other things being equal.

Table IV-1 shows some support for our hypotheses and in general casts light on where implementation is furthest advanced. For example, school-based implementation has made greater strides West of the Cascades. Meanwhile, work-based implementation seems to have proceeded further in schools in metropolitan areas, perhaps reflecting these schools' greater access to a broad pool of employers.

Table IV-1
Differences in School Characteristics
Between High and Low Implementation Schools

	School-Based Implementation		Work-Based Implementation	
	Low	High	Low	High
Pct of schools West of Cascades	59.5	78.3*	64.9	69.6
Pct of schools in metro area	56.8	65.2	51.4	73.9*

³⁹ For details in the creation of these indices, see Appendix E.

⁴⁰ The variable is coded from questionnaire item 7 and represents, on a 5-point ordinal scale, the number of years elapsed the school's school-to-work efforts formally began; responses of 5 (not yet formally begun) have been recoded as a score of 0.

⁴¹ This variable represents, on an ordinal scale, the number of years since school-to-work implementation formally began. Specifically, this variable is coded from questionnaire item 43i and represents the respondents' appraisal, on a 3-point scale, of whether "lack of staff, time, and money" has been a serious barrier, somewhat of a barrier, or not a significant barrier. Responses of "don't know" were re-coded to the approximate mean value.

Avg percent of minority students	17.7	24.5	16.9	25.7*
Pct students receiving free lunch	24.5	31.0	26.8	27.4
Avg pupil/teacher ratio	21.5	20.9	21.2	21.3
Average test scores, 1993-94	50.0	44.0**	48.2	46.8
Score for postsecondary involvement	-0.3	0.6**	-0.1	0.2
Score for business involvement	-0.2	0.4*	-0.4	0.6**
Years ago formally began STW	1.4	2.3**	1.7	1.9
Pct received STW funds, 1993-95	21.6	73.9**	43.2	39.1
Lack resources	2.5	2.6	2.6	2.4

Note: Figures represent average values for schools with Low (principal component scores of less than zero; N=37) and High (scores of greater than zero; N=23) measures of implementation. Significance tests are calculated as a t-test for difference in means between the Low and High implementation schools.

* The difference is statistically significant at the .10 level.

** The difference is statistically significant at the .05 level.

Differences in free lunch status are not significantly different between groups, but high minority schools are also more likely to have implemented work-based implementation more completely.

Average test scores are strongly related to the extent of school-based implementation, in the way we have predicted. Thus, high implementation schools have lower levels of student achievement, and efforts to boost outcomes for students likely partly explains why they have embraced STW more fully.

Strong partnerships are also related to the strength of implementation, with post-secondary institutions having a significant relationship with school-based implementation, but with business partners important for both dimensions of implementation. As another aspect of the importance of laying a strong foundation, having begun STW longer ago and having received set-aside funding are both related to the strength of school-based, but not work-based, implementation.

This pattern of which factors relate to school-based implementation and which to work-based implementation is especially revealing. Because special funding and time since implementation relate to school-based implementation but not work-based implementation, we conclude that schools' recent efforts under the School-to-Work

Opportunities Act have been particularly concentrated on building strong school-based components. By contrast, schools that are stronger in work-based implementation apparently represent those that already had strong work-based learning components, including school-based enterprises and cooperative education, activities that have been in place in many schools for many years.

The results in the table give a good picture of the concomitants of implementation. But, because many of these school characteristics are themselves interrelated, we present a regression analysis in Table IV—2 that helps sort out independent relationships.⁴² These results reinforce our speculation that special STW funding has been used to boost school-based components, but not work-based components; in fact, having received special funding is negatively related to work-based implementation.⁴³ Elsewhere in the table, higher average student achievement grades are associated with less fully implemented programs, including both school-based and work-based components, suggesting that schools with higher achieving students are less likely to embrace school-to-work as a school reform effort. Finally, lack of resources and the strength of business partnerships are both found to be significant determinants of work-based implementation. Establishing high-quality work opportunities for all students doubtless is extraordinarily labor intensive, requiring the STW coordinator to develop and monitor numerous worksites, train worksite supervisors, and develop strong training plans, and that fact is reflected in these findings. Similarly, work-based opportunities simply are not feasible if the business community is not willing to lend its strong support.

Other coefficients in the table are generally in the expected direction, but fall short of statistical significance at conventional thresholds.

In short, school-based and work-based implementation seem to represent two very different phenomena. The former appears to have been greatly spurred by specially earmarked funding for school-to-work programs and is heavily driven by schools that have adopted designs that are relatively recent, such as the career path model. By contrast,

⁴² Given that we have only 60 observations and that many school characteristics are strongly interrelated, several potential explanatory factors were deleted from the model.

⁴³ This negative association should probably be interpreted as meaning that schools with more advanced work-based implementation (i.e., that had a long history of providing students work or simulated work learning opportunities, as in school-based enterprises and cooperative education) were less likely to seek special STW funding, rather than that receiving the funding in some sense caused a degradation in work-based components.

work-based implementation is of longer vintage, seems not to have been especially spurred by the recent rounds of funding, and is to a greater degree driven by designs that are more often associated with traditional vocational education, such as cooperative education, the work-based learning activity in which the most students participate.

Table IV-2
Regression Analysis of School-based and
Work-based Implementation

	School- Based	Work- Based
Intercept	-0.80 (2.22)	3.78 (2.40)
Pct of schools West of Cascades	0.08 (0.63)	0.83 (0.69)
Pct of schools in metro area	0.77 (0.58)	0.63 (0.63)
Avg pupil/teacher ratio	0.09 (0.08)	0.08 (0.09)
Average test scores, 1993-94	-0.07** (0.03)	-0.06* (0.03)
Score for postsecondary involvement	0.33 (0.25)	0.12 (0.27)
Score for business involvement	0.33 (0.23)	0.62** (0.25)
Pct received STW funds, 1993-95	1.77** (0.54)	-1.36** (0.59)
Lack resources	0.44 (0.45)	-1.18** (0.49)
R-squared	0.43	0.30

Note: Numbers represent regression coefficients (with standard errors in parentheses). The analysis is based on the 61 schools in our sample that returned completed surveys.

* Significant at the .10 level.

** Significant at the .05 level.

V. OUTCOMES ASSOCIATED WITH IMPLEMENTATION

As discussed in Chapter I, the rationale underlying the school-to-work movement is that all young people—not just lower achievers or the non-college bound—will be better prepared for their futures when their high schools programs are imbued with career themes, when academic learning becomes contextualized and occurs in complex “authentic” situations, and when students are active participants in the learning process. The forerunners of these principles are impressive in pedigree. John Dewey, who articulated many of the principles of the school-to-work movement almost a century ago, decried what he saw as the artificial separation between academic and vocational learning and believed that movements underway at the time to develop academic and vocational tracks in secondary schools were seriously misguided. He emphasized that developing the capacity of young people to think critically can best be achieved when their natural instincts to discover and explore are given free reign:

To organize education so that natural active tendencies shall be fully enlisted in doing something, while seeing to it that the doing requires observation, the acquisition of information, and the use of constructive imagination, is what most needs to be done...Education through occupation ...combines...more of the factors conducive to learning than any other method. (Dewey, 1916 reprinted 1977: pp. 137, 309).

Advocates of school-to-work systems can with some justification also claim grounding in modern cognitive psychology. Although these claims are sometimes overblown, evidence does suggest that, at least for some tasks, learning occurs best when learners are active participants who are involved in creating learning for themselves in a meaningful context (see the review in Anderson, Reder, and Simon, 1998).

Bringing these diverse streams of thinking together, the advantages of school-to-work systems are believed to be manifold. First, following Dewey’s line of thinking, contextual active learning of the sort being promoted is believed to best promote higher-order thinking skills. As youth exercise these skills again and again in a variety of contexts, rather than engaging in rote memorization, they develop the ability to problem solve, think critically, analyze information, communicate ideas, and make logical arguments. Because these skills are increasingly in demand among the nation’s employers, potential future labor shortages can be averted, while well-trained workers will find their labor market opportunities much enhanced (U.S. Department of Labor, 1991; Johnston and Packer, 1987; Bailey, 1995). Second, these learning methods are thought to increase

youth's motivation for learning. By helping young people see the applicability of what they are learning to the world around them and their futures, school-to-work systems can be highly motivating. By virtue of this fact, youth might apply themselves more forcefully to their schooling, including their academic courses, and develop a greater interest and inclination in pursuing postsecondary education. Third, the methods associated with school-to-work often imply learning as part of a collaborative and interactive process as a member of team. As such, a "community of support" develops for learning that again enhances youth's motivations and overcomes the depersonalization endemic to many of America's schools that has been identified as a contributor to lagging student achievement and higher dropout rates (Kemple, 1997).

HYPOTHESIZED EFFECTS OF PARTICIPATION IN STW IN THE SHORT AND LONG TERM

An important implication of these ideas is that the benefits of school-to-work systems should not be viewed in a narrow sense of training young people for specific jobs. Instead, the vision is much broader. The goal is to impart in students a strong foundation in academic skills, higher-order thinking skills, and a motivation for learning, and thus to better prepare them not only for eventual employment but for postsecondary education and, indeed, for lifelong learning. The emphasis the School-to-Work Opportunities Act places on forging partnerships between secondary schools and postsecondary institutions and its call for involving students of all types clearly reflect the legislation's intention that school-to-work should not be construed merely as a variant of vocational education for the non-college bound, and should promote, not limit, access to higher education.

Given these objectives, efforts to test the effectiveness of school-to-work systems must be broad based as well, and reflect both employment-related and education-related outcomes. Consistent with these ideas, estimates of the impacts of school-to-work must also make a distinction between those to be expected in the short-term and longer-term. In the short-term, participation in a well-developed school-to-work system can be hypothesized to improve high school attendance, boost high school academic achievement, reduce dropout rates, and improve the likelihood that students will pursue postsecondary education upon leaving high school.

Short-term effects on employment-related outcomes are less clear-cut, however. Clearly, students who are pursuing postsecondary education may not be employed in the several years immediately after they leave secondary school, or, if they are employed, it may be with the purpose of supporting themselves through their post-secondary education

rather than establishing a career. For those in postsecondary education, therefore, weak employment outcomes can scarcely be taken as evidence of a lack of success. Thus, to the extent that school-to-work systems boost rates of post-secondary attendance, they may paradoxically appear to retard employment success, at least in the short run.

Even for young people not attending postsecondary institutions, hypothesized effects of school-to-work systems on employment-related outcomes in the short term are not clear-cut. Much has been made of the floundering that characterizes the efforts of the non-college bound to establish a toehold in the labor market in the several years following their leaving high school (see for example Osterman, 1980). Indeed, such floundering, characterized by frequent job hopping interspersed with spells of unemployment, can represent missed opportunities for investment in firm-specific training that typically accompanies steady employment and can “scar” young people if they become labeled by employers as unsteady and unreliable (D’Amico and Maxwell, 1994; Ellwood, 1982).⁴⁴ One key motivation of the School-to-Work Opportunity Act was precisely to reduce this excessive and unproductive job instability. At the same time, if school-to-work systems in secondary schools indeed increase rates of post-secondary attendance, the non-college goers who remain are in some sense negatively selected and could to this degree represent an intrinsically less able pool of job applicants on average than their peers from schools without school-to-work systems in place. In looking at the short-term employment success of non-college-goers from different schools, we thereby run the risk of making comparison between very disparate pools of job applicants.

For all these reasons—the focus on postsecondary education rather than immediate employment and the uncertain long-term effects of short-term job hopping—hypothesized effects that well-developed school-to-work systems should have on youths’ employment-related outcomes in the short run are not clear cut.

Expected longer-term impacts on employment are much clearer, however. The impetus for establishing school-to-work systems is that secondary school youth who participate will be better prepared for the challenges of the high performance workplace than their peers who do not. Because of their better preparation—which should manifest itself in the form of sound academic skills, the ability to problem solve, adaptability in a

⁴⁴ On the other hand, although excessive floundering is clearly undesirable, a certain amount of job instability in the early years can be acceptable or even beneficial, to the extent that it represents job-shopping behavior by young people who are seeking to find positions that maximize the fit with their abilities and interests (Becker and Hills, 1980 and 1983).

changing workforce, and so on—such workers will be more valuable and productive employees and will be rewarded accordingly.⁴⁵ If these payoffs are not realized immediately after youth leave high school, for the reasons noted above, they should nonetheless be in evidence some years later. Moreover, to the extent that participation in a well-implemented school-to-work program increases rates of post-secondary attendance, as we have previously argued, employment impacts should be magnified, because it has been well established that those who have attended post-secondary education ultimately earn more than their peers who do not.⁴⁶

MODELS OF YOUTH OUTCOMES IN THE SHORT-TERM

As discussed in Chapter II, with the data we have at hand we are able to examine only short-term outcomes associated with school-to-work implementation for the 1995-96 exiting cohort. These outcomes include, from the GFS data matches, whether the youth attended two-year or four-year postsecondary institutions, and credits earned, during the period from shortly after their expected high school graduation date (July of 1996) to approximately one year later (June of 1997). From the GFS data matches with the state's Unemployment Insurance files, we also can measure whether the youth were employed, and their earnings, for each quarter during the same time period. In either case, we are measuring outcomes for the entire exiting cohort, numbering some 16,000 young people, for the schools in our sample.⁴⁷

⁴⁵ The positive association between work skills and employment-related outcomes (e.g., greater probabilities of employment and higher levels of remuneration) appeals to commonsense and has been established both theoretically and empirically in a voluminous body of literature spanning many decades.

⁴⁶ How far out one should look after youth leave high school to detect these effects is not clearcut. To make this point, imagine a hypothetical student who attended a secondary school with a well implemented school-to-work program and who is thereby induced to attend a 4-year college when she might otherwise have entered the labor market immediately after graduating from high school. Although many young adults do work while attending college, the jobs they hold are typically not particularly well paying nor do they reflect their ultimate career choices; thus, her employment outcomes in the several years while she is attending college might understandably look quite unfavorable. By contrast, her peer who began working shortly after leaving high school without attending college would have had several years to establish a foothold in the labor market and begin the process of wage advancement that comes with labor market experience. It might take our college graduate a while for her earnings to “catch up” and surpass her peer, but they surely should in time, given the well known labor market returns to post-secondary education. Put differently, the college goer should have a steeper wage trajectory that will cause her to outpace her peer, even if she is four or five years delayed in getting started.

⁴⁷ Both outcomes are measured subject to the restrictions identified in Chapter II. Thus, data matches were only possible for the approximately 70 percent of students whose schools provided a Social Security Number and can identify those who were employed or attending post-secondary education only

From the student survey, we can characterize the youths' appraisal of their preparedness for work and their assessment of the helpfulness of various training experiences they might have had while in high school. Finally, from the employer survey we have the employers' assessment of the students' work preparedness, for a sample of 100 students who were employed. Both the student and employer surveys were administered approximately 16 to 21 months after the students' expected high school graduation date.

Consistent with the research design described in Chapter II, these outcomes are examined as a function of various measures of the completeness of the schools' school-to-work implementation during the time when the recent exiters were secondary school students. Building on results presented in Chapters III and IV of this report, these measures include: the completeness of school-based and work-based implementation, the strength of business and postsecondary partnerships, and various measures of the schools' resources and capacity for school-to-work implementation.

Control variables include the students' demographic characteristics, including their race and gender; school characteristics (other than its completeness of school-to-work implementation), including its pupil-teacher ratio, percent of the student body eligible for free or reduced-price lunch, and average 11th grade achievement test scores; and characteristics of the local economy, including the unemployment rate and the average earnings of workers in wholesale and retail trade industries. Finally, the percentage of each high school's cohort for whom outcomes were measured is included in the equation as a way of controlling for potential selectivity bias. Further details on the measurement of all variables, as well as simple descriptive statistics, are included in Appendix F; a discussion of the data sources and analysis strategy can be found in Chapter II.

We emphasize that coefficients associated with school-to-work implementation should not at this stage of the analysis be viewed as representing impact estimates. As demonstrated in Chapter IV, Washington's schools demonstrate unequal propensities to embrace school-to-work as school reform, in ways that are systematically related to the achievements of their students, among other things. We cannot be confident that we have been able to adequately control for these pre-existing differences between schools, even with the battery of control variables we have at our disposal. Consequently, we cannot be

within the state of Washington. Additionally, certain types of post-secondary training might not be captured, nor will employment in sectors of the economy not covered by the state's UI system.

certain whether coefficient estimates associated with school-to-work implementation in fact represent the net effects of school-to-work systems on students' outcomes, or rather reflect pre-existing differences between schools that caused some to implement school-to-work more fully than others. For this reason, the analyses we are presenting in this chapter should be viewed as constituting the Phase I baseline measures, against which the Phase II results will be judged.

Imagine, for example, that secondary schools whose graduates demonstrate distressingly low proclivities for attending postsecondary institutions decide to embrace school-to-work as a strategy for boosting students' achievements.⁴⁸ We would find in this case that school-to-work implementation was negatively associated with the schools' rates of postsecondary attendance; in other words, schools that were more fully implemented would be less likely to see their exiters attend postsecondary institutions. This association would not represent the effect of school-to-work implementation per se, but rather a pre-existing difference between schools. However, the influence of these pre-existing differences can be purged by looking at changes over time, both in school-to-work implementation and youths' outcomes. In so doing, we can identify much more clearly the true impact of school-to-work implementation.⁴⁹ These results must await this evaluation's Final Report, which will be prepared once the Phase II data collection has been completed (see Chapter II for more details).

Baseline Results for Postsecondary School Attendance

Based on the GFS data, we have identified three key outcome measures pertaining to postsecondary school attendance; these represent cumulative credits earned in the year after the youths' expected high school graduation date at two-year postsecondary institutions, at four-year postsecondary institutions, and at institutions of either type.⁵⁰

⁴⁸ This scenario is entirely plausible given the results in Chapter IV, which showed that school-based implementation was furthest advanced in schools whose 11th grade students had demonstrated lower achievement test scores earlier in this decade.

⁴⁹ Because the pre-existing differences between schools are viewed as fixed, the impacts of school-to-work systems can be deduced to the extent that changes in youths' outcomes are associated with changes in implementation, if other possible explanations for the changes in youths' outcomes can be controlled (e.g., changes in labor market conditions).

⁵⁰ One disadvantage with the choice of these as outcome measures is that their distributions are steeply peaked (there are many sample members with zero credits earned) and sharply skewed. However, exploratory analyses we conducted with various alternative specifications of the dependent variable (e.g., a dummy variable for whether the youth attended college) yielded conclusions that were substantially the same.

Regression results for these outcomes are presented in Table V—1. For each outcome, two models were estimated. The first includes measures of school-based and work-based implementation in the equation as regressors, along with the control variables that have already been discussed (e.g., student demographic characteristics, other school characteristics, labor market characteristics). The second equation represents a reduced-form equation, in that it includes as regressors measures of resources for implementation and the strength of business and postsecondary partnerships, which (following the discussion in Chapter IV and the conceptual model presented in Chapter I) might be thought of as determinants of the strength of work-based and school-based implementation.

Looking at Model 1 for each outcome first, the results show an interesting pattern of association involving the measures of implementation across the various outcomes. Work-based and school-based implementation are both significantly related to credits earned at four-year and two-year postsecondary institutions, but their coefficients have opposite signs and both flip signs from one outcome to the next. Thus, work-based implementation is negatively related to credits earned at four-year colleges, but positively related to credits earned at two-year colleges; the pattern is just reversed for school-based implementation. Meanwhile, the cross-cutting effects of each measure of implementation essentially cancel each other out when total credits earned at either institution is treated as the outcome instead, so that neither variable turns out to be significant.

These patterns can be interpreted reasonably well when linked with findings presented earlier in this report. We have learned from Chapters III and IV that schools furthest along in work-based implementation primarily represent those with strong pre-existing programs in cooperative education, a work-based teaching strategies that has a long history and has historically been closely identified with traditional vocational education. Moreover, we have found that STW funding that schools have recently received has not led to much change in their work-based implementation. By contrast, the strength of school-based implementation is strongly related to STW funding and to this degree seems to represent a much more recent phenomenon, as schools move to develop the career path models in response to the principles embedded in the School-to-Work Opportunities Act.

Given this understanding of how school-based and work-based implementation have come about, the pattern of effects we observed in the table makes reasonably good sense. Schools that are stronger in work-based implementation are positively associated with

two-year college attendance for their students, in keeping with their focus on more traditional models of vocational education as their school-to-work focus; as a corollary, their students are less likely to be attending four-year colleges. By contrast, schools that are stronger in school-based implementation are more closely identified with four-year college attendance, in keeping with their implementation of new models of school-to-work systems less identified with vocational education and with a focus on improving academic achievements for everyone.

This pattern of association can be interpreted in one of two ways. On the one hand, the regression coefficients might represent true causal effects, in which case we are left with the important conclusion that different modes of school-to-work implementation boost students' achievements in distinctly different ways, and that recent funding has been used to bolster rates of postsecondary attendance at four-year colleges. Or, these coefficients might represent pre-existing differences between schools, and reflect schools' proclivities for developing school-to-work systems in different ways in the first place. To the extent that the array of school characteristics used as control variables in these equations effectively control for these pre-existing differences, the first interpretation would be favored. However, consistent with our research design, the prudent course is to reserve judgement, by treating these as baseline findings reflecting merely patterns of association that the Phase II results, when they are completed, will further illuminate.

The reduced-form models (Model 2), with measures of school resources and partnerships used in place of the implementation scales, reinforce the associations we have previously discussed. Thus, these results show that schools that have recently received STW funding have higher rates of attendance at four-year colleges among their former students, as do schools with stronger business partnerships. For the reasons just discussed, it would be premature to interpret these findings as evidence that recent funding has boosted rates of four-year college attendance, as opposed to merely reflecting pre-existing differences between schools.

Although not the focus of our evaluation, other patterns of association in this table are worth noting and are generally very consistent with prior theory and research. Thus, lower SES schools, as reflected by the percentage of the student body receiving free or reduced-price lunches, are associated with reduced rates of college credits earned, significantly so in the case of four-year colleges. Meanwhile, average 11th grade test scores are positively associated with four-year college credits earned but negatively associated with two-year college credits earned. Among the local economic factors,

higher unemployment rates appear to significantly increase rates of four-year college attendance, presumably because the opportunity cost of attending college rather than working is lower. Finally, males and members of minority groups are shown as less likely to have earned postsecondary credits.

Baseline Results for Employment-Related Outcomes

However important school-to-work efforts might be for training a strong workforce, our earlier discussion has suggested that hypothesized effects on youths' employment and earnings *in the short run*—in the year or two after they leave school—are quite uncertain. Nonetheless, in the interests of establishing a baseline model for the Phase II results, we show several models here.

The first outcome examined is a yes/no filter for whether the young person was employed any time in the year after his or her expected graduation date, based on evidence from the UI data matches. Employment outcomes for those attending post-secondary school are particularly uninteresting in this context, because their focus in the immediate term is on attending school rather than working. For this reason, the models were estimated after excluding those who had earned any credits at post-secondary institutions during this period. In other words, we are looking just at those who had not continued their formal education past secondary school, and for whom employment is presumably more important.⁵¹ As with our earlier table, two models are estimated for this outcome, with the first showing associations with the strength of implementation and the second representing a reduced-form equation.

The results, shown in Table VI—1, reveal that, even with this sample restriction, neither work-based implementation nor school-based implementation bears a statistically significant relationship to whether the young person was employed. In fact, in keeping with this as a period of churning in the labor market for many youth, very little is statistically significant in this equation. Model 2 for this outcome, by contrast, does show that having received funds expressly earmarked for school-to-work efforts bears a weak but significant association with the probability of being employed.

⁵¹ Nonetheless, these models are not quite the same as examining whether or not young people were *unemployed* during this period (that is, not working but actively seeking work). Thus, some of those coded as not employed in our analysis might have deliberately chosen not to seek employment, for any number of reasons (e.g., household responsibilities, etc.). In fact, the *Report on the Student Survey* (Wiegand and D'Amico, 1998a) reports that about 40 percent of those not working since high school who were not post-secondary students cited personal or family reasons for not wanting to work.

We next restrict the universe still further to those who not only had not attended postsecondary school, but who had worked sometime during this period. For this subset of young people, we examine associations with their hourly rate of pay. In a finding that is ambiguous in its meaning, the strength of work-based implementation has a small negative association. Given all the caveats we have thus far issued, it is hard to know what to make of this. One very possible explanation is that the seemingly low wages earned by those who exited from schools with stronger work-based implementation were still working at their high school jobs in the post-school period. This phenomenon, of young people continuing to work at jobs they had in high school even after they graduate, is well known. Potentially, young people who participated in high school internships or cooperative education programs, in which wages are normally quite low, held these jobs for an indefinite period after they left high school.

Finally, we note that, consistent with prior research, males earn more than females and some minority groups experience lower rates of employment and lower wages. Higher average earnings in the local labor market raises hourly wages, but, paradoxically, so does the unemployment rate.

Table V-1
Multivariate Models of Employment Outcomes

	Employed		Hourly Wage	
	Model 1	Model 2	Model 1	Model 2
Intercept	0.61	0.76	4.42***	4.75***
Measures of STW				
Work-based implementation	-0.03	---	-0.08***	---
School-based implementation	0.00	---	0.03	---
Strength of business partnerships	---	-0.02	---	-0.02
Strength of postsecondary partnerships	---	0.02	---	0.03
Received STW funding	---	0.15*	---	0.11
Student Characteristics				
Gender (1=male; 0=female)	-0.06	-0.05	0.81***	0.82***
Youth is Asian	-0.75***	-0.76***	-0.06	-0.08
Youth is African American	-0.41***	-0.43**	-0.42*	-0.44**
Youth is Hispanic	-0.15	-0.14	-0.13	-0.09
Youth is American Indian	-0.17	-0.16	-0.09	-0.04
School Characteristics				
School is in West	-0.07	-0.15	0.36**	0.32***
School is in a metro area	0.15	0.12	0.02	0.04

Pupil/teacher ratio	-0.02	-0.03*	-0.03	-0.03*
Percent free lunch	-0.00	-0.01	-0.00	-0.00
Average 11 th grade test scores	-0.01	-0.00	-0.01	-0.00
Local Area Characteristics				
Unemployment rate	0.09***	0.08***	0.05**	0.03
Avg earnings in service industries	0.05***	0.05***	0.05***	0.04***
Pct of students in school w/ GFS data	-0.00	-0.00*	0.01***	0.01***
N	5,623	5,623	3,937	3,937
R-squared	na	na	0.05	0.04

Note: The first models use a dummy variable for whether or not the student was employed anytime in the year after leaving high school, with the sample restricted to those young people who had not attended post-secondary institutions in Washington during this time. The models were estimated using logit analysis; the coefficients represent maximum-likelihood estimates. The final two equations were estimated with the sample additionally restricted to those who had been employed during this period, and the dependent variable represents the youth's implied hourly wage (based on earnings during the last quarter in which work had occurred). These models were estimated using regression analysis. Asterisks denote statistical significance at the .10 (*), .05 (**), and .01 (***) levels.

INFORMATION FROM THE STUDENT SURVEY

The results we have presented thus far are drawn from the GFS, and thus reflect the experiences of a substantial subset of the approximately 16,000 young people who were seniors in the schools in our sample during the 1995-96 school year. However, we also have information available from the Student Survey for a much smaller subset. As was described in Chapter II, this survey was administered either by phone or mail to approximately 850 of these 16,000.

Students' Appraisals of the Helpfulness of their School Programs

Among the batteries of questions these respondents were asked was whether they had participated in each of various school-to-work activities while in high school and, if so, how helpful (on a six-point scale) the experiences were in "preparing you for a career." Results are reported in Table V—1, with the first column showing student participation rates and the second column reporting the percentage of students rating the activity as helpful.⁵²

⁵² The figures for helpfulness are based on those students who participated in the activity in question and are defined as the percentage giving a rating of 4 or higher, on a 6-point scale.

The table shows that the participation rates vary widely across activities, ranging from a high of 88 percent for filling out a career questionnaire to a low of 13 percent for participating in a Tech Prep program. In general, activities that are the most prevalent are also rated as least helpful in preparing students for their careers, and vice versa.⁵³ Moreover, prevalence and ratings of helpfulness seem also to be related to intensiveness of the activities, from the standpoint of the likely duration of the students' participation or the resources and effort the activity requires to establish. Thus, the more time and energy the activity requires, on the part of the student, the schools, and employers, the fewer are the numbers of students who participate, but the more highly valued the activity appears to me. For example, as can be seen in the table, the activities that involve the highest numbers of students are "completing a career questionnaire" and "attending a career talk." Both of these activities are one-time, relatively brief actions. But these activities are rated as the least helpful in preparing students for the future, with no more than about one-half of the respondents providing a favorable rating. Brief, one-time interventions may be easy to make available to many students, but their

Table V-1
Activities Participated in During High School
and Their Reported Helpfulness

	Pct who Received It	Percent Rating it as Helpful
Fill out a career questionnaire	88.1%	40.2%
Attend career talks	69.4	57.0
Take classes focused on learning about careers	25.5	71.4
Go on field trips to workplaces	31.9	62.3
Talk to teachers about career	66.5	73.1
Have individual counseling sessions about careers or college	55.2	63.7
Regularly talk to adults outside school about careers or college	51.0	82.0
Take courses to develop career skills	53.8	83.0
Took academic courses focused around	57.5	82.6

⁵³ The correlation between these two columns of numbers is -.62, indicating a fairly strong inverse association.

career themes

Do any job shadowing	33.9	84.7
Prepare an individual portfolio	33.6	70.6
Work in a business at school	20.0	65.2
Participate in program allowing dual enrollment in college classes	22.7	81.8
Participate in a Tech Prep program	13.4	92.5
Select a career major	20.0	79.5
Receive high school credit for work experience	25.1	71.1
Have a paid job that someone at school helped you get	23.7	73.4
Have an unpaid internship	17.0	79.9

Note: Figures in the first column of numbers represent the percentage of respondents who indicated they participated in the given activity. Figures in the second column represent the percentage rating the activity as “helpful” for their career (ratings of 4 or higher on a 6-point scale), from among those who had participated in the activity.

utility seems limited, according to our respondents. It is quite possible that schools began offering these activities earlier than they developed other, more intensive school-to-work activities, because they were easier to implement and helped to start the transition toward a complete school-to-work program. Such efforts may not be misplaced, but the results shown in the table indicate that, while schools may be able to reach a wide audience with these activities, they should not expect that these activities alone constitute a complete school-to-work program, or meet students’ needs.

In contrast, activities that are intensive in what they entail or are more difficult for schools to establish also tend to be rated by our respondents as the most helpful. Unfortunately, however, these activities also reach the fewest numbers of high school students. Thus, participating in Tech Prep, in which the last two years of high school lead directly to the first two years of college, was rated as helpful in preparing students for the future by almost everyone who participated, but only 13 percent of our respondents had engaged in this activity. Other, low incidence but intensive or hard-to-arrange activities include job shadowing, participating in a program allowing dual enrollment, receiving high school credit for work experience, and having a paid job arranged by the school. Each of these was rated as helpful in preparing students for their careers, but not many of our

respondents reported participating in them. Perhaps as school-to-work becomes more established, activities such as these will be expanded to include a greater percentage of students. If so it would offer more students the opportunity to engage in activities that appear to be viewed very favorably.

In general, then, more extensive activities—those reaching greater numbers of students—are rated as less helpful for one's future, while more resource-intensive activities—those involving more time and energy on the part of schools or students—are usually rated as very helpful but are often low incidence. There are some minor exceptions to these general patterns, however. As shown in the table, for example, some prevalent activities also rate favorably. Thus, about two-thirds of students talk to their teachers or counselors about their careers and 73 percent find it very helpful to do so. This finding is consistent with prior research that has shown that students highly prize individual attention and the sense that someone cares about their future. Similarly, over half of the respondents took academic courses structured around a career theme, and 83 percent found them helpful. In an exception of a different sort, working in a business at school, which we intended to represent participation in a school-based enterprise, is very resource intensive and, fitting the overall pattern, has a very low prevalence rate, but has among the lowest ratings of helpfulness, with just about two-thirds of participants rating it favorably.

Assessments of Work Preparedness

We also asked students how well high school helped them to develop general skills often needed at a workplace, such as being able to meet work deadlines, having adequate communication skills, being self-motivated, and having adequate basic skills. The results of these questions are shown in Table V—1. As with the earlier battery of questionnaire items, respondents were asked to provide ratings of helpfulness on a 6-point scale (1=not at all helpful, 6=very helpful), with the table showing those who gave a rating of 4 or better.

As can be seen, students generally give their schools high marks, with at least two-thirds giving a positive appraisal on almost every item. Evaluations were especially high for helping students develop basic reading (84 percent), writing (74 percent), and math skills (75 percent). Based on this evidence, schools appear to be doing a satisfactory job in giving students a strong foundation in traditional academic subjects. Also receiving high marks were preparing students to work with others as a team (80 percent). Receiving the least positive appraisal, with about one-half of the students expressing

helpfulness, was the extent to which high schools helped our respondents see the link between school and the “real” world.

Generally, then, the respondents in our sample are reasonably positive about the helpfulness of their high schools in preparing them for the future. While no item was met with universal approval, most of the questions elicited favorable responses. Also noteworthy, skills on which schools were rated as most helpful tend to be those that represent traditional domains: reading, writing, math. By contrast, high schools were rated as less helpful in developing some of the skills which are to be emphasized as school-to-work efforts expand, including seeing a link between school and the real world, understanding what is required to be successful in a career, and setting goals for one’s future. These data thus suggest that schools can do much better in helping their students to relate their schoolwork to their future lives. In this context, it would seem that the expansion of school-to-work systems would be a welcome occurrence.

Table V-1
Helpfulness of High Schools in Developing
General Work Skills

	Percent Rating School as Helpful
Meet work deadlines	69.3%
Communicate with supervisors and co-workers	66.8
Be punctual	70.6
Be self-motivated	68.4
Develop basic reading skills	84.1
Develop basic writing skills	73.7
Develop basic math skills	75.3
Understand what is required for success	63.8
Gain confidence in abilities	69.6
See link between school and the “real” world	51.4
Set goals for future	62.8

Cooperate with supervisors and co-workers	70.7
Accommodate changes in routines	67.2
Independently solve problems	63.8
Work with others as a team	80.0

Note: Figures are based on those respondents giving a valid response, and represent the percentage giving a rate of 4 or higher on a 6-point scale (with 6 representing the most favorable rating).

Associations of Helpfulness with Participation in STW Activities

This assessment is given additional support by the comparison in helpfulness ratings between those students who identified themselves as participating in at least one intensive school-based or work-based activity and those who did not.⁵⁴ These results are shown in Table V—1. Strikingly, the results show that those who identified themselves as participating in an intensive activity rate their schools consistently more favorably than others for about half the items shown; just as striking, the items showing the largest differences are precisely those relating to higher-order thinking skills and other SCANS skills that school-to-work systems are hypothesized to most effect.

Thus, students with intensive participation in a school-to-work activity reported that their high schools were more helpful in teaching them how to communicate effectively with supervisors and co-workers, and they thought their schools did a better job of giving them confidence in their abilities, understanding the link between school and the “real” world, setting goals for the future, cooperating with supervisors and co-workers, accommodating changes in routine, and independently solving problems. These results thus suggest that Washington’s school-to-work initiative can have an important role in building a strong workforce for the future.

⁵⁴ Students who participated in an intensive school-to-work activity are defined to be those who reported participating during high school in at least one of the following activities: worked in a business at school, participated in a program allowing dual enrollment in college classes with high school credit, participated in a Tech Prep program, selected a career major, received high school credit for work experience, had a paid job during high school that people at school helped them get, or had an unpaid internship.

INFORMATION FROM THE EMPLOYER SURVEY

In addition to asking students about their work preparedness, we also surveyed the employers of those students who indicated that they had been employed at some time in the three months preceding their interview and who were not also attending postsecondary school or, if they were postsecondary school students, indicated that they considered themselves primarily a worker rather than a student. Completed employer surveys were returned for 91 of the 165 students who meet these conditions; these students are drawn from all schools in our sample, and thus may or may not have participated in a school-to-work system.⁵⁵

Table V-1
Comparisons of School Helpfulness Ratings by Whether the Student
Participated in an Intensive STW Activity

	Not a STW Student	Is a STW Student
Meet work deadlines	69.7%	69.1%
Communicate with supervisors and co-workers	60.3	69.4**
Be punctual	67.7	71.8
Be self-motivated	64.7	69.9
Develop basic reading skills	84.0	84.2
Develop basic writing skills	75.1	73.1
Develop basic math skills	73.8	75.9
Understand what is required for success	62.1	64.5
Gain confidence in abilities	62.2	72.5**
See link between school and the “real” world	45.2	53.9**
Set goals for future	56.7	65.3**
Cooperate with supervisors and co- workers	64.8	73.2**

⁵⁵ Note that these surveys were administered to the youths’ immediate work supervisor, and the respondents were asked to judge the work preparedness of that specific young person only, and not employees at the firm in general.

Accommodate changes in routines	58.6	70.8**
Independently solve problems	55.1	67.5**
Work with others as a team	77.6	80.9

Note: Figures are based on those respondents giving a valid response, and represent the percentage giving a rate of 4 or higher on a 6-point scale (with 6 representing the most favorable rating). Whether the respondent is a STW student is defined based on whether the student participated in at least one intensive school-based or work-based activity. Further details are provided in the text. T-tests were used to test whether the means in the second column are significantly different from those in the first.

* The difference between columns is statistically significant at the .10 level

** The difference between columns is statistically significant at the .05 level

We asked these employers for both a general indicator of the employee's ability to learn important skills, as well as their assessment of the worker's current abilities in a variety of specific basic and SCANS skills. Each of these measures was recorded on a four-point scale, allowing the employer to indicate whether the employee's skills in a particular area were "poor," "fair," "good," or "very good." In each case the employer was rating their employee who was a 12th grade student during the 1995-96 school year, and who is in our student sample.

In general, employers had high praise for their workers' ability to learn the important skills needed for the job. In a question tapping the worker's overall preparedness, employers were asked how the employee in question compared to other workers at similar positions at the company. The results, reported in Table V—2, show that almost 65 percent of employers rated their employees as "very good" compared to other workers in the ability to learn the important skills necessary for the job, and an additional 23 percent (N=21) rated their employee as "good" compared to other workers at the company.

Table V-2
Employers' Overall Assessment of
Students' Work Preparedness

	<u>Percent</u>
Poor	2.2%
Fair	10.0

Good	23.3
Very Good	64.4

This general finding of employers' satisfaction is echoed throughout most of the specific skill domains asked about as well, as is suggested by Table V—3. Across the board, employers gave their employees high marks for measures of personal behavior and performance measures of basic skills and SCANS skills.

Personal Behavior. Most of the items relating to personal behavior are among the ones for which employees received the highest marks. For example, almost all of the employees in our sample were rated by their supervisors as being honest and displaying appropriate behavior and dress on the job. The one weakness, and the item rated the lowest of all those asked about, is punctuality. Just 77 percent of employers rated their young workers favorably on this dimension, suggesting that tardiness is something of a problem for almost one-quarter of those in our sample.

Basic Skills. A second set of skills for which employers were asked to rate their employees include those relating to basic skills, including verbal abilities, reading, writing, and mathematical skills. Ratings for these measures are also quite high in most areas, with about 90 percent of work supervisors assessing the workers' basic skills as good or very good. Skills in verbal communication, including the ability to communicate effectively with supervisors and co-workers, is given the least favorable rating from among these, with about 20 percent of employers giving a rating of fair or poor.

Across all four basic skills measures, then, it appears as though employers are happy with the level of basic skills displayed by their workers. This suggests that the preparation these employees were given during high school is at least satisfactory, generally matching the students' own aggregate self-appraisals.

SCANS Skills A final set of questions asked employers to rate their workers in areas that were identified by the Secretaries' Commission on Achieving Necessary Skills (SCANS). These skills include problem-solving and efficiency skills, as well as sociability and cooperativeness, among others.

Ratings in these areas were more varied, but employers are still overall expressing favorable opinions of their young workers. Flexibility in accommodating change and cooperativeness with others were rated most highly among the items in this group, with about 90 percent of employers expressing approval. But the ability to problem solve, to

work with others, efficiency, and attention to detail were viewed favorably by only about 80 percent of employees.

The sample size on which these findings are based is quite small and of uncertain generalizability. Based on the results we have collected, however, the overall picture seems fairly positive overall. Employers express particularly high opinions about the students' personal behaviors and basic skills, but are overall somewhat less enthusiastic about their SCANS skills. Issues concerning efficiency, attentiveness to quality, and problem-solving skills seem to be special areas in which exiting students could be better prepared upon entering the labor force. Each of these areas is targeted by school-to-work programs.⁵⁶

Table V-3
Percent of Employers Giving a Favorable Rating
of the Students' Work Preparedness

	<u>Percent</u>
Personal Behaviors	
Honesty	97.8
Appropriate behavior	94.7
Appropriate dress	88.4
Punctuality	77.9
Basic Skills	
Verbal communication	80.6
Reading	91.3
Writing	87.0
Math	91.1
Other SCANS Skills	
Problem solving	79.3
Ability to work with others	80.4
Efficiency in completing tasks	80.9
Attentiveness to quality	80.9
Cooperation	89.5
Flexibility to changes	88.0

⁵⁶ Because of small sample sizes, it was not feasible to compare the responses of employers of students who participated in intensive STW activities to those who did not.

Note: Figures represent the percentage of employers giving a rating of “good” or “very good.”

VI. SUMMARY AND CONCLUSION

The past decade has been a period of rapid change in conceptualizing school-to-work. As we noted in the introductory chapter, the focus of STW interventions has evolved from a primary concern with improving the employment preparation and prospects of the non-college-bound to an emphasis on establishing integrated STW systems designed to help all students, regardless of whether these students are deemed college-bound or not.

This systems approach thus seeks to integrate education about careers, work experience, and academic learning for all students. It emphasizes the integration of academic and vocational skills instruction and increasing “real-world” learning experiences through the provision of work-based activities, as a complement to school-based learning. Additionally, STW promotes a fundamental change in pedagogical approach from a rote-learning process to one that requires self-directed learning, with the aim of promoting higher-order thinking skills. As we have discussed, these changes are consistent with the changing nature of work, from a centrally managed industrial model requiring repetitive work, to a relatively decentralized model requiring greater intellectual skills, the ability to work cooperatively in groups, effective communication skills, attention to quality control, and the ability and willingness to be a lifelong learner.

Current conceptualizations of STW thus emphasize systemic changes that are designed to benefit all students. Rather than having a two-tiered educational system with high-standards academic preparation for some and low-standards general track or vocational preparation for others, STW proponents advocate the integration of these two types of education and the elimination of tracking. Other important system-wide changes include the articulation of learning across different levels of education, the use of career majors as an organizing principle, and strong partnerships with business, labor, and communities.

In keeping with these concepts, we proposed an analysis of student educational and employment outcomes as a function of the stage of STW implementation at the high schools in our sample. We hypothesized that students leaving schools with better-developed STW programs would be better established on a career path after leaving school than those from schools with less well-developed programs. Stage of implementation was defined in terms of the extensiveness and intensity of student participation, and the quality of their STW experiences. We were also interested in

variations among schools depending on whether they had adopted school-based, work-based, or balanced approaches to STW implementation. We hypothesized that these factors would be in turn influenced by the capacity of the school to implement STW transition activities and the strength of local partnerships.

SUMMARY OF THE FINDINGS

Our surveys corroborated findings from earlier evaluations conducted both in Washington State and around the nation that schools have made substantial progress in several areas of school-based and work-based learning, but that implementation is still far from complete. As examples of *school-based* activities, career assessment and counseling were among the most well developed in most schools. Schools indicated, and results from the student survey confirmed, that most seniors had undertaken a career interest assessment as part of their school program. However, our student respondents indicated that just over one-half of them discussed their college or career plans in a one-on-one session with their schools' guidance or career counselor.

School-based learning activities in the STW framework should encompass much more than career guidance, and might entail any of a number of approaches to academic and vocational skills integration, including the use of career academies, career majors or pathways, and Tech Prep models. The schools in our sample varied greatly in the extent to which these alternative approaches were used. A general finding is that most schools had some of these school-based components in place, but that relatively few students participated. For example, almost 80% of the schools in our sample had established Tech Prep or other articulated programs with postsecondary schools, but rarely do more than small proportions of students participate. Several indicators of quality also showed incomplete implementation. For example, project-based learning was uncommon and students were rarely clustered for academic classes with others that shared their career focus, making the integration of academic and vocational learning much more difficult.

Consistent with language in the School-to-Work Opportunities Act, career majors seem to be becoming more common. Although only about 40 percent of the schools in our sample had adopted career majors as an organizing principle, this figure should be interpreted in a positive light because pathways are a relatively recent school-to-work component that entails substantial systemic change. Moreover, in schools where career majors were widespread, a large majority of seniors had participated.

In the school-to-work context, *work-based* opportunities are arranged by the school and are designed to reinforce classroom-based learning. In terms of extensiveness, we

found that nearly all schools provided work-based learning of some type. Cooperative education was especially prevalent, presumably because this activity has a very long history. Nonetheless, although most schools have work-based activities in place, relatively few students were participating. Indeed, in only a handful of schools in our sample did more than half of the students participate in either cooperative education or paid or unpaid internships. For those who do participate, however, the experience seems to be potentially of high quality, as mentorships and the use of written training plans to guide learning were common.

In reviewing the data on work-based and school-based implementation, we found that there is a strong tendency to develop unbalanced strategies. Most schools tend to emphasize *either* work-based strategies or school-based strategies—very rarely do they proceed smoothly in gradually developing dual strategies of an idealized school-to-work system at the same pace. A plausible explanation for this phenomenon is that schools that have favored work-based strategies do so for historical reasons—these are generally schools that had substantial vocational educational programs before STW implementation began in earnest. On the other hand, school-based implementation strategies are a more recent innovation and appear to have developed to a much greater extent than work-based activities as a result of STW *grants* to schools. In any case, even the schools in our sample that are furthest along in either dimension of implementation are far from achieving complete system reform when their efforts are judged on an absolute scale.

Developing broad and productive partnerships is crucial to the success of STW implementation. Results from our school survey show that the business community is particularly important to successful implementation. A majority of STW coordinators responding to the school survey reported that business has provided assistance in a wide variety of ways. By contrast, while coordinators found other partners supportive, their support was narrower. Two-year postsecondary institutions, for example, commonly had forged dual enrollment and articulated agreements and often participated in career fairs, but were not consistently active in other areas of STW. Local governments, community-based organizations, and labor and union groups are less active participants, as are four-year colleges and universities. Clearly, there remains room for expansion in engaging these latter partner groups.

In examining barriers to implementation, the school-to-work coordinators who we surveyed overwhelmingly identified a lack of resources—staff, time, and money—as the most important factor. Resistance by school faculty or staff was also perceived as an

important barrier to successful implementation. This finding reflects the difficulty many schools have in breaking down departmental barriers and overcoming the separation of vocational and academic teaching. In contrast, attitudes of parents, students, and school administrators appear generally favorable.

As explained in earlier chapters, estimating the net impact of school-to-work poses several challenges. Because school-to-work systems have been evolving rapidly over the last few years and because the interventions involve multi-faceted systemic reform, there are great variations in how school-to-work is implemented in different school districts and consortia. Rather than adopting a single model, schools in our sample have borrowed elements from different approaches, as the school survey results have suggested, making it difficult to characterize the nature of the intervention simply.

Moreover, several outcomes of STW efforts may not be completely realized until several years after youth graduate from high school. For example, various types of school-to-work activities may have longer-term impacts on employment and earnings that are not captured shortly after graduation from high school. Finally, schools that choose to implement STW reform often do so for specific reasons that relate to their schools' characteristics or their dissatisfaction with their students' achievements. For this latter reason, net impacts can be more fully measured using a model that estimates changes in the schools' outcomes as a function of changes in STW implementation. During Phase II of the evaluation, therefore, we will conduct both *intra*-cohort and *inter*-cohort comparisons. Analysis of outcomes at two time periods will better enable us to control for pre-existing conditions as well as to chart change over time. For this reason, the analyses we have presented in this report constitute Phase I baseline measures that we will later compare with Phase II results.

Analysis of Phase I results does however provide us with insight into the association of implementation with students' outcomes. We found that work-based implementation was negatively related to the credits students earned at four-year colleges, but positively related to credits earned at two-year colleges. This pattern is just reversed for school-based implementation, which was negatively related to the credits students earned at two-year colleges, but positively related to credits earned at four-year colleges. This result reinforces the sense that schools that are stronger in terms of the work-based axis represent schools with a history of vocational education and are more likely to be oriented to preparing students for specific jobs, whereas schools that have chosen a school-based strategy tend to be more "academic" in focus with a higher proportion of students moving

directly to four-year colleges. Not surprisingly, given that so many of the young people in our sample were attending post-secondary school at the time of our data collection, neither work-based implementation nor school-based implementation bears a statistically significant relationship to whether the non-college-goers were employed.

Surveys of young people did provide a great deal of information that is potentially useful for schools seeking to implement STW. Students indicated that they more highly valued school-to-work activities that required more time and resources. Unfortunately, those activities reaching greater numbers of students are rated as less helpful as preparation for the future, while those activities involving more time and energy on the part of schools or students are usually rated as very helpful but are often low incidence. As examples of very common, but less highly valued interventions, we cited career questionnaires and career talks, both of which require relatively brief interventions and relatively little energy on the part of teachers and administrators. On the other hand, activities that require more engagement on the part of schools tended to be the most highly valued. For example, participating in Tech Prep, in which the last two years of high school lead directly to the first two years of college, was rated as helpful in preparing students for the future by almost all those who participated, but relatively few had engaged in this activity. Similarly, having a paid or unpaid internship, choosing a career major, and engaging in job shadowing were all rated very favorably, but reached relatively few respondents.

We also found that student respondents believed that high schools were at least somewhat helpful in developing their general skills often needed at a workplace, such as being able to meet work deadlines, having adequate communication skills, being self-motivated, and having adequate basic skills. While a majority of students rated their schools positively in all dimensions we asked about, evaluations were especially high for helping students develop basic reading, writing, and math skills as well as preparing them to work with others as part of a team. Fewer students, but still a majority, believed that high schools helped them in terms of some of the principal objectives of STW programs, including to see the link between school and the “real world,” understand what is required for success, solve problems independently, set goals for the future, and communicate effectively with others.

In a very encouraging result, we demonstrated that the former high school students in our survey sample that participated in intensive STW activities rated their schools consistently more favorably than others on many of these dimensions. In particular, they

tended to believe more strongly than do students who had not participated in such activities that their schools helped them develop higher-order thinking skills and other SCANS skills, areas that are a particular focus of school-to-work efforts. These students also reported that their high schools were more helpful in giving them confidence in their abilities, allowing them to understand better the link between school and the “real world,” cooperate with others, and independently solve problems. These results thus suggest that, for those students who have benefited from the more intensive components of STW, Washington’s school-to-work initiative is viewed very favorably.